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NATO Air Forces

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SEPTEMBER 1979 50p

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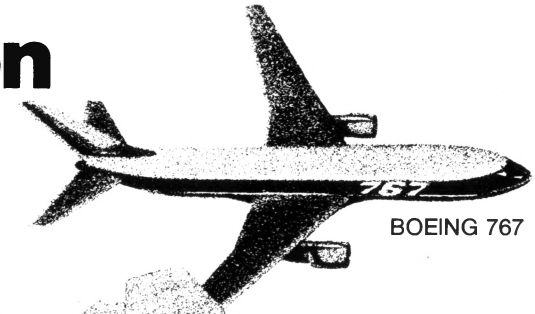

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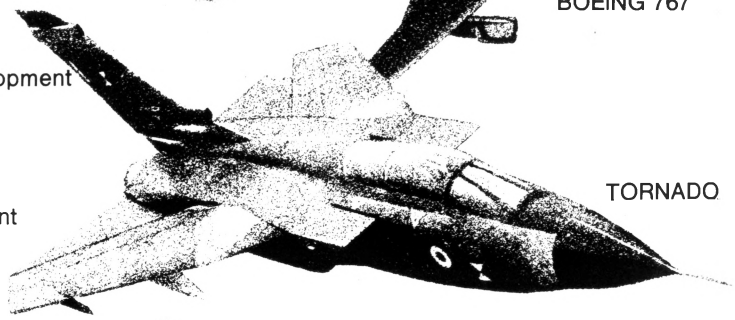

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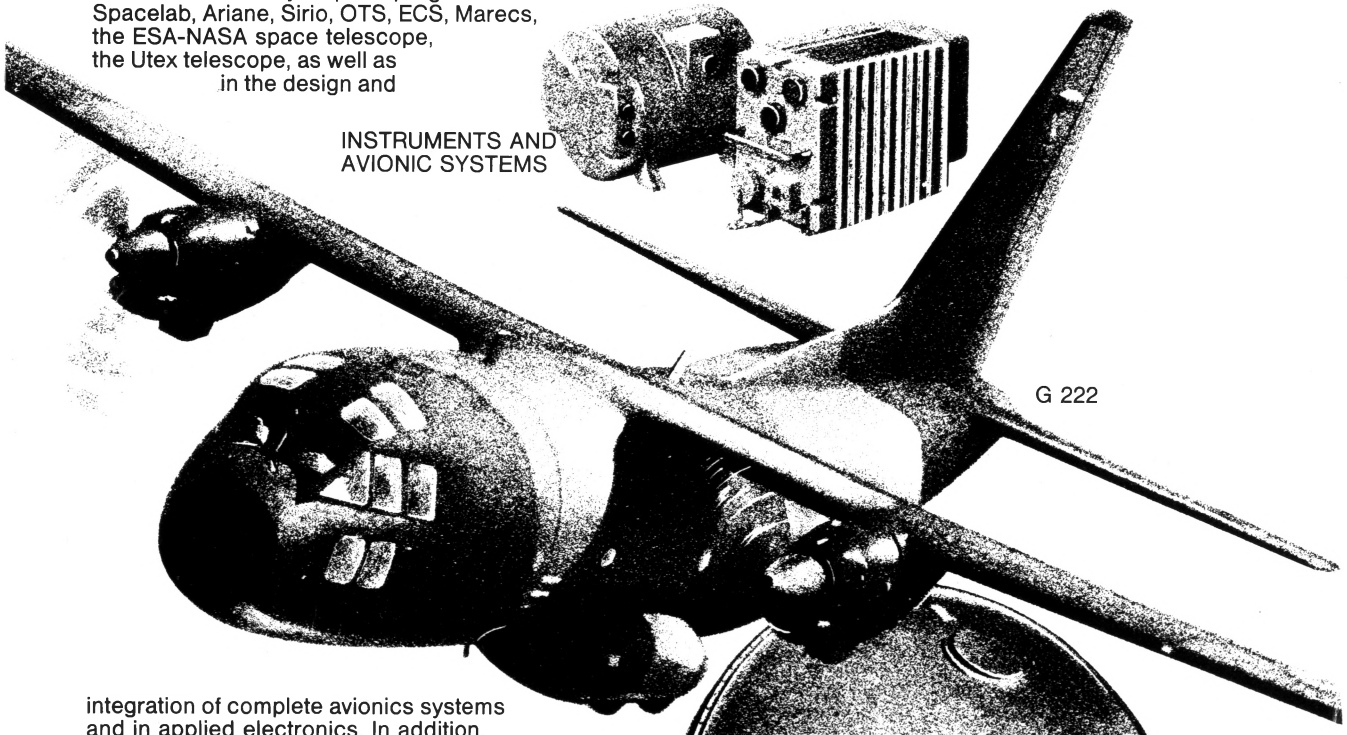

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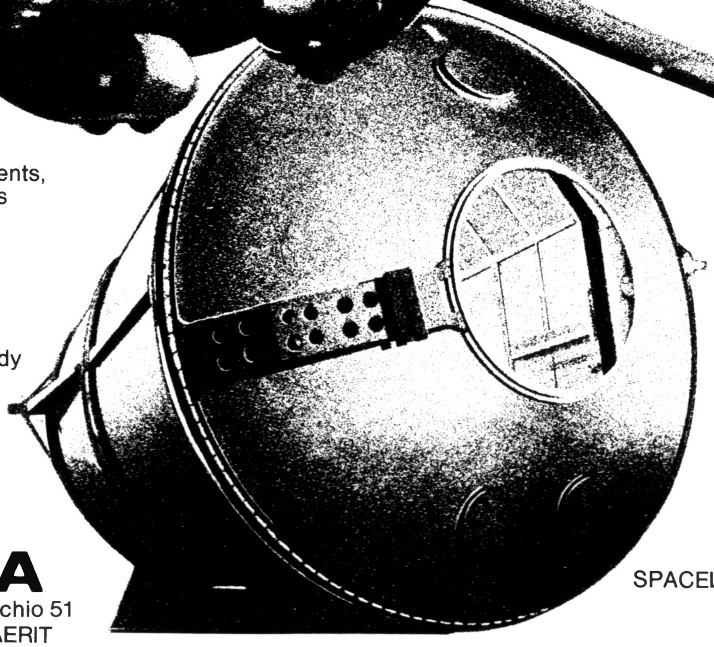

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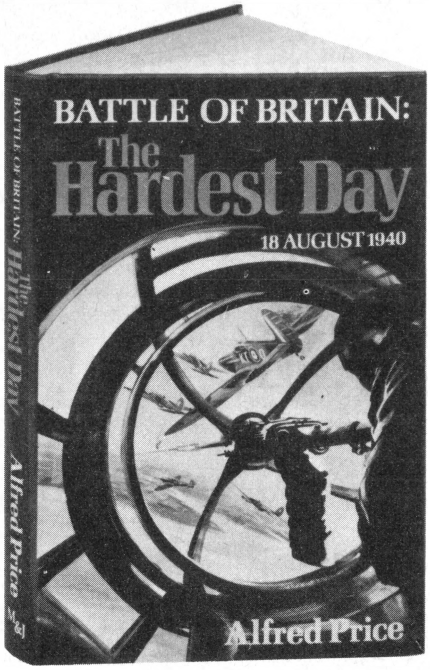

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Editor David Dorrell
Historical Editor Charles W. Cain
Dial House, 6 Park Street
Windsor, Berks. SL4 1LU
Telephone: Windsor 69777

Advertisement Manager
John G. Nealen
T. G. Scott & Son Ltd.,
30-32 Southampton Street,
London WC2E 7HR
Tel.: 01-240 2032

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COVER: Hawker Siddeley Harrier GR.3 of No. 1 Squadron, R.A.F., Wittering, operating from Bardufoss, north Norway, during Exercise "Cold Winter" in March this year. In the background are two R. Norwegian A.F. Northrop F-5As (Photo: Rolls-Royce Ltd.)

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AIR pictorial

NATO Today

NATO HAS now kept the peace in Europe for more than thirty years—a better record than that achieved by individual European states which allowed only twenty-one years to separate two World Wars. Those old enough to remember either one or both those conflicts—particularly people who suffered total loss of freedom, and worse, under foreign occupying armies—will wish to ensure that war or enslavement never comes to them again. But the years roll on and for an increasing majority the foregoing perhaps has little relevance.

NATO's first need is to convince the peoples of the member states that there is a continuing need for the Alliance, and that it has to be paid for. In recent years several members, including Britain, have been guilty of backsliding on the latter item; they need re-educating.

NATO's physical needs must be related to the threat it has to counter, a threat which has increased to such an extent—both in quantity and, even more worrying, quality—that today the East appears to have the edge over the West. Further, it is now accepted that the likely warning time the Alliance might expect of a Warsaw Pact attack has been cut from weeks to days, possibly even hours. Much will depend therefore on NATO's Air Forces, to provide an immediate response wherever the blow might fall; as the Chief of the Air Staff, Air Chief Marshal Sir Michael Beetham, puts it: aircraft would have to be "the force of the first few hours" (see April issue page 121).

This issue contains a detailed study of NATO's Air Forces and while some of the facts presented may seem reassuring, others are not.

It is well known that NATO is numerically inferior in aircraft to the Warsaw Pact. Western Governments usually quote a ratio of about 1 to 2.5, but even that might be optimistic; study the table on page 343.

NATO should, in our opinion, put more effort into achieving night/all-weather capability—to counter the not unlikely possibility that the enemy might choose the worst visibility conditions in which to launch a major attack. It would appear that most of NATO's Air Forces—with the exception of the R.A.F., the *Luftwaffe* and USAFE—do not have the equipment to operate effectively at night. Southern Europe is particularly weak.

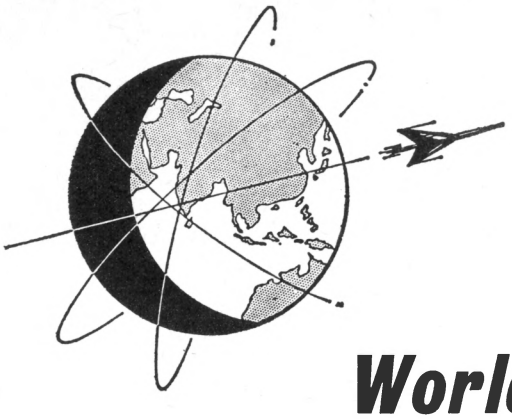
One wonders, too, whether NATO still attaches any importance to, or is capable of, conventional strategic bombing—striking at the enemy's heart, his factories, power stations, and places likely to hurt. Or do we have to go straight from tactical-cum-interdiction to nuclear? We in Britain have been told what Russia's "Backfires" and "Fencers" could do to this country—hence the belated measures to strengthen U.K. air defence. But these, surely, are to meet a conventional threat; otherwise buttons might be pushed.

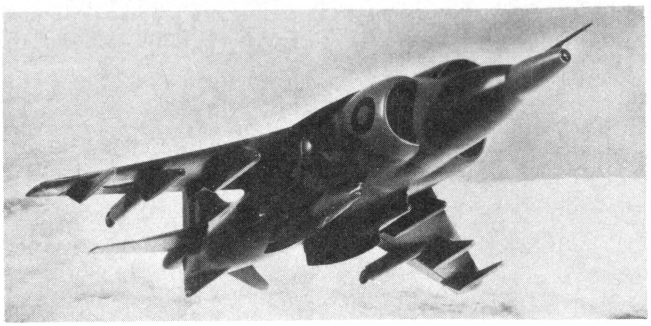
Lastly, all NATO countries must never forget that the threat in Europe is only one half of a now discernible Russian plan. The other threat, outside Europe and increasing daily, is directed at the West's supply lines.

NEW ADVERTISEMENT MANAGER

Air Pictorial has appointed a new Advertisement Manager, Mr. John G. Nealen of T. G. Scott & Son Ltd., whose address and telephone number can be found at the top left of this page.

Classified advertisements will in future be the responsibility of Mr. Chris Leeson of the same company (see page 373).





Impression of the "Big Wing" Harrier which has two extra pylons (outermost) to carry air-to-air missiles for self-defence

World Air News

U.K. air defence

ACKNOWLEDGMENT THAT there is something wrong with Britain's air defences (see February issue, page 41, and May, page 161) finally came on 27th July when Mr. Geoffrey Pattie, Under-Secretary of State for the R.A.F., announced in the House of Commons that: a third squadron of BAC Lightnings is to be formed (confirming our report in the June issue, page 207); "a substantial number" of Hawker Siddeley Hawk trainers are to be armed with Sidewinder missiles; and all R.A.F. McDonnell Douglas Phantoms are to have their weapons control systems improved.

Rumour has it that the new Lightning squadron will be No. 45, to be based at Binbrook alongside the two existing Lightning squadrons, Nos. 5 and 11, which have about thirty F.6s and six F.3s between them. The new squadron will be equipped from reserve aircraft stocks and pilots will be drawn from the R.A.F.'s "fast jet pool" – instructors, aircrew at present on ground tours, and retrained transport pilots.

The last Lightning to be built for the R.A.F. was handed over in August 1967. It is believed that further spare parts may have to be manufactured and it could be two years before the new squadron becomes fully operational.

Main change to the Hawks to be converted into emergency fighters relates to electrical wiring to enable them to carry and fire two AIM-9L Sidewinders. The first of these aircraft should be ready early next year. The Hawks will operate in daylight only, be crewed mainly by instructors from the Tactical Weapons Unit at Brawdy, and defend local targets such as airfields. The R.A.F. has 175 Hawks on order and perhaps up to a hundred may be Sidewinder-armed.

Mr. Pattie emphasised that these were "stop-gap measures" and added that "it is not possible just to wave a magic wand and produce resources from nowhere when we have been through such difficult times".

Air Canada choose Boeing 767

Air Canada have announced that they are to buy twelve Boeing 767-200s, with options on a further eighteen. The aircraft will be powered by 48,000-lb. s.t. Pratt & Whitney JT9D-7R4D engines and be delivered between October 1982 and November 1984.

This order will bring sales of the Boeing 767 up to 96 plus options on a further 99. *Air Pictorial* has still to receive news of the Canadian order from Boeing—in fact, this is the first month we can remember that there has been a complete absence of news of orders from Seattle.

Airbus orders

Thai Airways International have ordered two more A300B4 Airbuses, bringing their total up to ten, and have options on a further four. To be delivered in the third quarter of 1981, the two new aircraft will be A300B4-200s, powered by General Electric CF6-50C2 engines and with maximum take-off weight increased to 165 tonnes. Thai International's first eight Airbuses are all of the 'B4-100 version; the eighth aircraft is being delivered this month.

Air Inter, the French domestic airline, have ordered their seventh A300B2, due for delivery in February 1981; and Olympic Airways, the Greek flag-carrier, have increased their Airbus order to five A300B4s plus five options.

Sales of the A300 now total 175 plus options on a further 77. Orders for the A310 stand at 52 firm plus 55 options, making a grand total of 359 Airbus aircraft on order or option.

In addition, Martinair, the Dutch charter company, have announced that they plan to buy three A310s which will be the first of a new convertible freighter version; this contract has still to be signed.

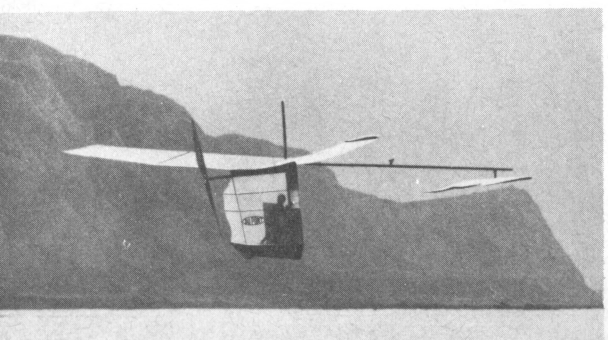
"Big-wing" Harrier

British Aerospace have released further details of the "Big Wing" which has been designed to fit on to existing Hawker Siddeley Harrier GR.3s and T.4s with the minimum of modification.

Area is increased by 25 per cent from 201 to 250 sq. ft. and span from 25.3 to 32.0 ft. Aspect ratio has been increased from 3.2 to 4.1 and leading-edge sweep reduced from 40.4 to 37.5 deg. Track of the outrigger wheels has been reduced from 22.2 to 18.0 ft., which will be beneficial on narrow road surfaces.

The Big Wing offers improved manoeuvrability and STO performance, can accommodate 245 gal. extra fuel, and

Left: *Bryan Allen pedalling his way to fame in Paul MacCready's Gossamer Albatross on 12th June when he made the first man-powered flight across the English Channel from Folkestone to Cap Gris Nez. Award of the £100,000 Kremer Prize was ratified by the Royal Aeronautical Society on 30th July.*
Right: *The McDonnell Douglas DC-9 Super 80, glistening white with blue and gold trim, emerges at Long Beach. It is expected to fly next month.*



has six pylons. The inner four pylons can take all existing Harrier loads, while the two new outboard pylons are designed to carry air-to-air missiles (to give the Harrier air-defence capability) or ECM pods.

Shenyang F-6s in Egypt

Now in service with the Egyptian Air Force are some forty Shenyang F-6 fighters (licence-built MiG-19s) supplied by China, with the likelihood of another forty to follow. Recent political changes have meant the severing of ties with Russia, and Egypt is now turning to other countries, including the West, for arms supplies.

Friendships for KLM

KLM Royal Dutch Airlines have ordered three Fokker F.27 Friendship Mk. 500s for use by their domestic and regional subsidiary NLM CityHopper. Due for delivery in October-December 1980, the new aircraft will replace some of the airline's older Friendships. NLM's current all-Fokker fleet comprises six Friendships and four F.28 Fellowships.

Sales of the Friendship now total 696, including 205 built under licence by Fairchild.

Future Airbus projects

Derek Brown, until recently Head of Projects and Research for British Aerospace's Hatfield-Chester Division, has been appointed Vice-President, New Products Co-ordination of Airbus Industrie. Now based in Toulouse, he will be responsible for the build-up of policy concerning future projects beyond the current A300 and A310 programmes, in particular for:

(i) Very-long-range four-engined wide-bodied 200-seat airliner.

(ii) Stretched short/medium-range twin-engined wide-bodied airliner of up to 300-330 seats.

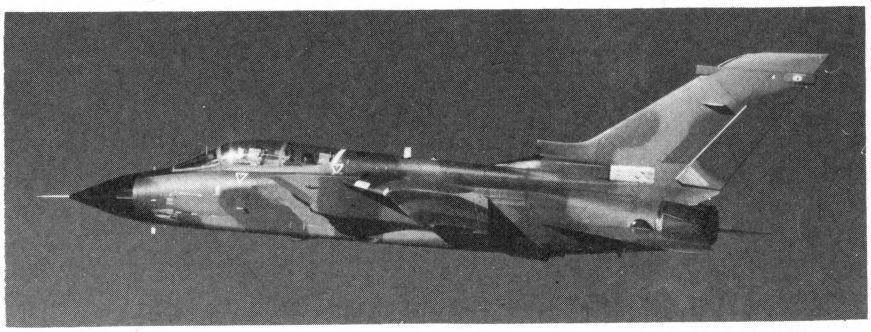
And/or (iii) Short/medium-range single-aisle 120/160-seat airliner.

Aérospatiale's new trainer

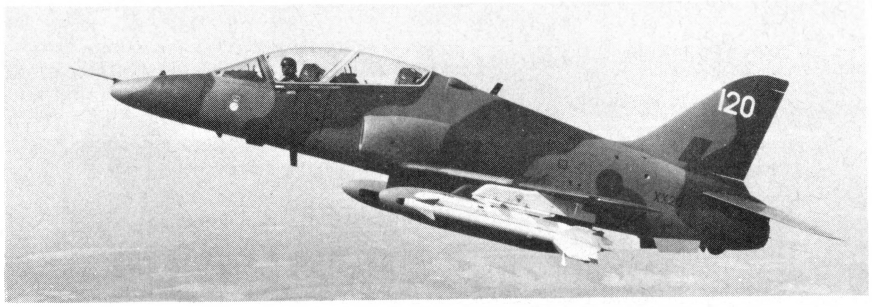
Aérospatiale are now going ahead with the development of their TB.30 two-seat tandem trainer intended for the *ab initio* phase in the French A.F. The aircraft, shown in model form at the recent Paris Air Show, has been given the name "Epsilon" and will in future take French A.F. pilots through the basic training phase, after which they will progress to the Fouga 90 and Alpha Jet.

Powered by a 300-h.p. Lycoming, the Epsilon will have a maximum speed

The prototype Panavia Tornado F.2 (air-defence variant), serial ZA254, was rolled out by British Aerospace at Warton on 9th August and is expected to fly this month



The first production Tornado, GR.1 ZA319 (alias BT.001), during its first flight at Warton on 10th July. Germany's GT.001 flew at MBB's Manching airfield on 27th July



Above: *Hawker Siddeley Hawk T.1 XX205 carrying air-to-air missiles on outer pylons*

Right: *The first two Sepecat Jaguar Internationals for the Indian A.F.—a two-seat trainer serialled J1001 (foreground) and single-seat J1003—were handed over by British Aerospace at Warton on 19th July. They are ex-R.A.F. machines fitted with uprated Adour 804 engines. The Indian A.F. plans to acquire about 150 Jaguars, 110 of which will be built under licence by Hindustan Aeronautics Ltd.*

Developed jointly by West Germany and Japan, the Messerschmitt-Bölkow-Blohm/Kawasaki BK 117 eight/ten-seat helicopter, D-HBKA, flew at Ottobrunn on 13th June

World Air News . . .

of 190 kt. and be stressed for manoeuvres up to +7*g* and −3.5*g*. The prototype now being built by Aérospatiale's light aircraft subsidiary, SOCATA, at Tarbes, is expected to fly before the end of this year. A photo of the TB.30 model appeared in the October 1978 issue, page 391.

BO 105s for Spanish Army

The Spanish Government has ordered sixty Messerschmitt-Bölkow-Blohm BO 105 helicopters for use by Army units (*FAMET*) on observation, anti-tank (armed with HOT missiles) and communications duties. Final assembly of the helicopters will be carried out under licence by CASA in Spain.

MBB state that this order brings sales of the BO 105 "up to the neighbourhood of a thousand".

Black Hawk in service

The first eight Sikorsky UH-60A Black Hawk helicopters for the U.S. Army were delivered to the 101st Airborne Division (Air Assault) at Fort Campbell, Kentucky, on 19th June. The 101st—nicknamed the "Screaming Eagles"—has already started an intensive programme to develop operational techniques with the new helicopter, including troop movement, resupply and external lift missions.

Winner of the UTTAS competition, the Black Hawk can carry eleven fully equipped troops and has a hook capacity of 8,000 lb. The U.S. Army plans to procure a total of 1,107 UH-60As.

P3T missile go-ahead

British Aerospace Dynamics Group have received a Ministry of Defence contract to complete development and supply an initial production quantity of their P3T missile, which will be used in the anti-ship role by R.A.F. Buccaneers and Tornadoes and R.N. Sea Harriers in the 1980s.

A "fire-and-forget" weapon, the sea-skimming P3T can be used in all weathers, and is equipped with an active radar homing head and computer. Target positional information is fed into the computer before firing and the computer controls the P3T's flight path until the homing head locks on to the target in the final phase.

U.K.—China air services

Under a new Anglo-Chinese air services agreement recently signed in Peking, British Airways hope to start a twice-weekly service from London to Peking (initially via Hong Kong) on 1st April 1980, using Boeing 747s. The Civil Aviation Administration of China (CAAC) will also operate two services a week, probably with Boeing 707s.

Provision has also been made for scheduled services between Hong Kong and the most important cities in China. Cathay Pacific will probably operate a service from Hong Kong to Shanghai and also to Peking as soon as British Airways have established a more direct service to the Chinese capital, omitting Hong Kong.

U.S.A.F. tanker deployments

During a six-week period starting on 31st July Boeing KC-135 Stratotanker units of the U.S.A.F. Reserve have been deployed to R.A.F. Mildenhall to augment the European Tanker Task Force.

First in were five KC-135s of the 452nd Air Refueling Wing from March AFB, California. They were followed by aircraft of the 940th Air Refueling Group, Mather AFB, California, and the 931st ARG, Grissom AFB, Indiana.

Aircraft leasing scheme

Via Nova International Ltd., Hurn Airport, Dorset, have introduced an aircraft leasing scheme which should be of special appeal to flying clubs and syndicates.

The scheme covers any aircraft but, for example, one costing £16,500 can be leased for two years for an initial payment of £355.88 and monthly payments of a similar amount plus a small flying hour charge.

Seen in Brazil before delivery, this convertible passenger-freight Embraer EMB-110P1 Bandeirante has now gone to Advance Airlines in Australia, becoming VH-AAS

NEWS IN BRIEF

British Caledonian Airways have withdrawn their bid to operate one of the two unsold U.K. Concordes (see May issue, page 163) primarily because of increased fuel prices but are planning a new Gatwick–Middle East–Hong Kong service.

A new Russian bomber, larger than "Backfire", capable of carrying cruise-missiles and with a range of over 7,000 miles, is under development. It is reported to be similar in concept to the cancelled U.S. Rockwell B-1.

Air Malta have bought two Boeing 720Bs from Western Airlines and now have an all-Boeing fleet of seven aircraft. Earlier acquisitions included three 720s (two recently purchased from Pakistan International) and two leased 707s.

U.S.A.F. names adopted for two new aircraft types are "Condor" for the General Dynamics F-16 fighter and "Extender" for the McDonnell Douglas KC-10A tanker.

SOGERMA, the Aérospatiale subsidiary, have overhauled their 830th and final Lockheed T-33 (21-155). The first T-33 arrived at Mérignac for overhaul in 1961.

Allegheny Airlines will shortly put four of their BAC One-Elevens up for sale and plan to dispose of all thirty in the next few years.

The FMA IA.58B, an improved version of Argentina's Pucará twin-turboprop ground-attack aircraft, has two 30-mm. DEFA cannon in place of the original 20-mm. guns, more advanced avionics and can carry a greater warload.

The R. Thai A.F. is likely to receive another fourteen Bell UH-1H helicopters to supplement the fifty or so already in service.

Pocono Airlines, a member of the Allegheny commuter group, have ordered two Swearingen Metro IIs for delivery in May and July 1980.

The R. Danish A.F. has ordered three Grumman Gulfstream IIIs for maritime surveillance and fishery protection duties.

The Egyptian A.F. is to receive thirty-five ex-U.S.A.F. McDonnell Douglas F-4E Phantoms under a new arms agreement with the U.S.A.

The Kenya A.F. expects to take delivery shortly of the first of a batch of thirty-two Hughes 500M-D Defender helicopters on order.

Falcon Airways of Dallas, Texas, have bought two Aviation Traders ATL.98 Carvairs from British Air Ferries, their last. The U.S. firm's earlier equipment includes two Douglas DC-4 freighters.

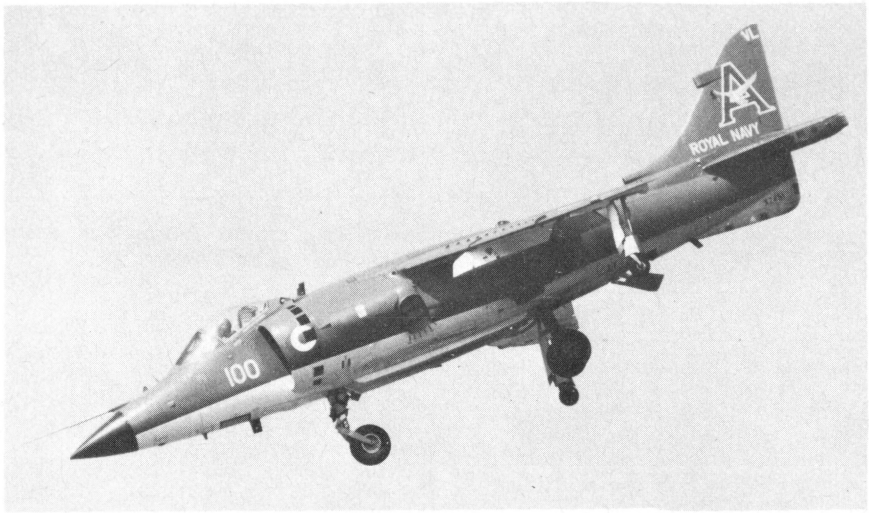
Aeroflot have opened a new weekly service from Moscow to Lima, Peru, via Kingston, Jamaica, using Ilyushin Il-62Ms.

Irish Helicopters, a subsidiary of Aer Lingus, have ordered a Sikorsky S-61N. Current fleet includes two Bell 212s and a Bölkow BO 105.

The Mexican Government has ordered four Embraer EMB-110 Bandeirantes for use as ambulances by the national health service.

The Guatemalan A.F. has started to take delivery of twelve Pilatus PC-7 Turbo Trainers and has options on a further twelve.

Mitsubishi Diamond I is the name chosen for the Japanese firm's new MU-300 twin-turbofan low-wing executive jet, which first flew on 29th August 1978.



The Royal Navy's first Hawker Siddeley Sea Harrier FRS.1, XZ451 of No. 700A Squadron, R.N.A.S. Yeovilton, now carries 700A's new markings on its fin—a harrier falcon superimposed on a large "A"—plus code "100" on the nose. It is seen at R.N.A.S. Culdrose's Air Day on 25th July (Photo: R. C. B. Ashworth)

Thomson-CSF's new RDM Cyrano 500 radar is now being flight-tested (in a Mirage nose) on Sud-Ouest SO.4050 Vautour No. 337 by the C.E.V. at Bretigny

Dassault Mystère/Falcon orders had reached 734 by 30th June, of which 546 had been delivered. Orders were as follows: Falcon 10—179, Falcon 20—453 and Falcon 50—102.

A Boeing KC-135 Stratotanker is being tested with vertical winglets ("longhorns") by NASA at Edwards AFB to evaluate drag reduction potential.

The R. Jordanian A.F. has ordered thirty-six Dassault Mirage F 1 fighters. The contract is believed to have been funded by Saudi Arabia.

The R. Norwegian A.F. plans to acquire a further three Lockheed Orions, funds permitting, to supplement the five P-3Bs at present operated by No. 333 Squadron at Andøya.

Recent shot at Marignane of the three helicopter types which Aérospatiale produce in co-operation with Westland (Left to Right): *Gazelle F-ZKCX (a British Army AH.1); Puma for the Spanish A.F. coded "402:05", temporarily F-WMHG; and Lynx XZ277 for the French Navy*

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The Beechcraft Super King Air.

Air Affairs

A monthly commentary by JOHN STROUD

BOTH ICAO and IATA have now published the air traffic results for 1978*. Presenting the world picture, ICAO show that on scheduled services the airlines of the ICAO member States carried 685 million passengers (12.3 per cent up on 1977), achieved 934,000 million passenger-km. (up 14.2 per cent), carried 10.8 million tonnes of cargo (up 8 per cent), flew 26,390 million freight tonne-km. (up 11.7 per cent) and achieved a total of 113,300 million revenue tonne-km. (up 12.9 per cent).

Out of these totals Aeroflot accounted for 98 million passengers, 140,000 million passenger-km., 2.4 million tonnes of cargo, 2,330 million cargo tonne-km. and 15,430 million revenue tonne-km.

The IATA "World Air Transport Statistics"—the 23rd edition—shows that outside the U.S.S.R., United Airlines is the biggest passenger carrier, with 41,291,824 passengers in 1978, but the three top IATA carriers, United, Eastern and American, achieved a total passenger figure greater than Aeroflot's—107,337,710—although the Soviet airline has a monopoly in its own country, whose population is comparable with that of the United States.

Two major U.S. carriers left IATA in 1978 and this affects the airline rankings in the year—these two airlines having carried a total of more than 42 million passengers in 1977.

Eighteen IATA airlines each carried more than 5 million passengers on scheduled services during 1978. They were, in order and times a million: United 41.3, Eastern 37.8, American 28, TWA 19.9, British Airways 15.7, Iberia 13.6, Japan Air Lines 12.3, Lufthansa 11.7, Braniff 11.5, Air Canada 11, Air France 10, Pan American (now out of IATA) 8.8, SAS 7.9, National 6.9, Alitalia 6.8, Saudia 6.2, Swissair 5.6, and Mexicana 5.3. Saudia and Mexicana joined this group for the first time.

Twenty-four airlines each flew more than 200 million cargo tonne-km. in 1978 with five each exceeding 1,000 million. The top-ranking cargo airlines were: Flying Tiger 1,689,699,000, Pan American 1,526,935,000, Lufthansa 1,344,785,000, Air France 1,276,306,000 and Japan Air Lines 1,209,101,000. United and American each achieved in excess of 900 million and British Airways, in 8th position, flew 862,414,000 cargo tonne-km.

In terms of total revenue tonne-km., twenty IATA airlines each exceeded 1,000 million in 1978, with the top six positions held by United, American, Pan American, TWA, British Airways and Eastern.

On scheduled services the IATA airlines had 5,892,000 aircraft departures with thirteen airlines each having more than 100,000. United logged 572,656, Eastern 566,421, American 386,906, TWA 295,365, Braniff 224,678, British Airways 218,705, Lufthansa 183,500 and Iberia 182,697.

Eight airlines had fleets of more than 100 aircraft. United operated 336, American 261, Eastern 248, TWA 211, British Airways 172, Air France 119, Air Canada 106 and Braniff 104. Lufthansa had 92 aircraft at the end of 1978, Iberia 90, Pan American 87 and SAS 75.

Twelve airlines each employed more than 20,000 staff at the end of 1978. British Airways headed the list with 54,645—although holding fifth place for passengers and revenue tonne-km. and eighth place for cargo tonne-km. United had 52,000, American 40,000, TWA 36,500, Eastern 35,900, Air France 32,000, Lufthansa 29,400, Pan American 27,000, Iberia 23,000, PIA 21,000, Japan Air Lines 20,900 and Air Canada 20,700.

Provisional figures show IATA airlines having operating revenues of $44,400 million in 1978 with operating expenses of $42,200 million.

ICAO's figures show twenty-seven fatal airline accidents in 1978 with 962 passengers killed to give a rate of 0.16 passenger fatalities per 100 million passenger-miles—the rate for IATA members being 0.08. The previous year's figures were 0.24 and 0.19 respectively.

* "World Air Transport Statistics 1978", available from the Industry Research Division, IATA, P.O. Box 160, CH-1216 Cointrin, Geneva, at U.S. $25. ICAO figures from "ICAO Bulletin June 1979".

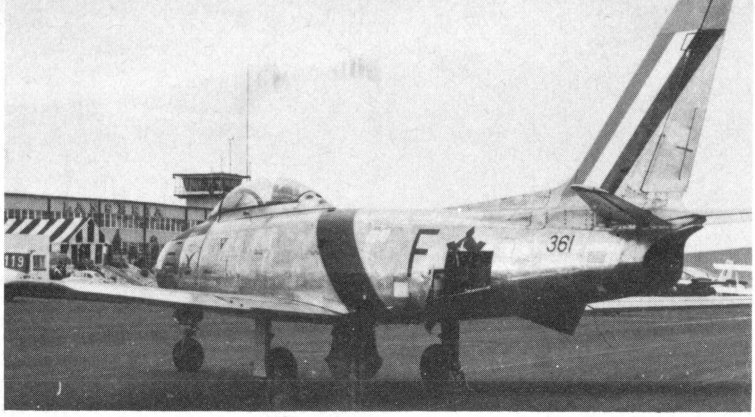
F-15 blooded

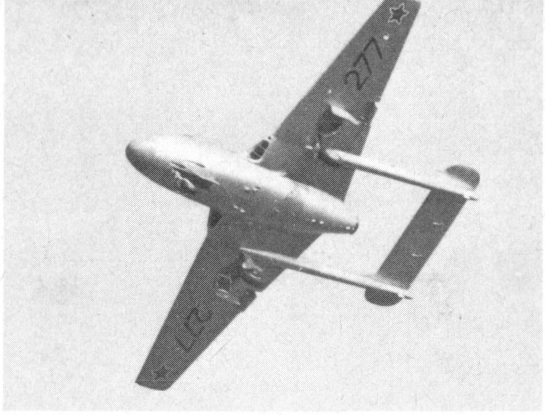
THE McDONNELL Douglas F-15 Eagle saw action for the first time on 27th June when six Israeli F-15s, providing cover for a strike force of four Kfir-C2s raiding Palestinian terrorist bases in southern Lebanon, engaged Syrian A.F. MiG-21s which tried to intercept.

The Israeli F-15 pilots claimed to have shot down five of the MiGs with no loss to themselves; the Syrians admitted the loss of four aircraft, but claim to have downed two Israeli fighters.

Airbus show for L.S.A.B.

ON WEDNESDAY, 12th September, London Society of Air-Britain members will be briefed by Airbus Industrie who will give a film and slide presentation talk on the A300 Airbus. The meeting starts at 7.00 p.m. in the Lecture Theatre, Holborn Central Library, 32–38 Theobalds Road, London, W.C.1. Non-members very welcome, admission 60p.





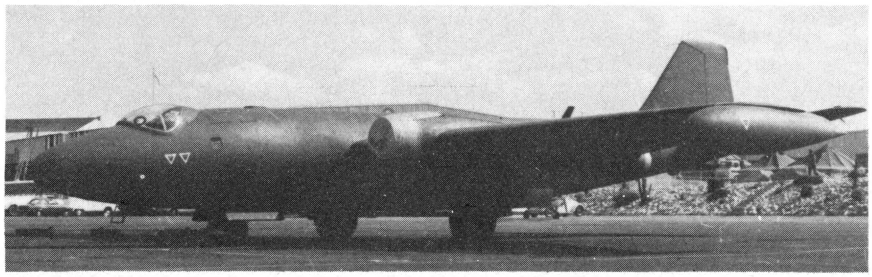
Left: *Canadair Sabre 6 of the S.A.A.F. Museum collection, restored in No. 1 Squadron colours.* Right: *D.H. Vampire T.55, serial 277, last of its type delivered, used its remaining airframe hours during the show and is now being retained as a static exhibit*

Lanseria '79

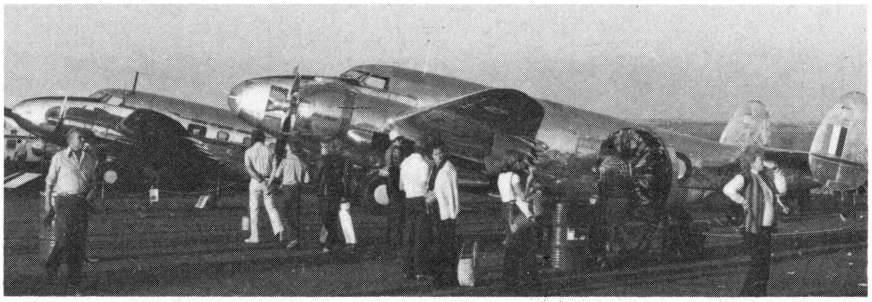
by KEN F. SMY

SOUTH AFRICA's biennial International Air Show, held at Lanseria Airport from 30th May to 2nd June, drew record crowds who were able to enjoy a varied flying programme—starting with hot-air balloon and hang-gliding demonstrations, followed by aerobatics by Pitts Specials, "dead stick" aerobatics by U.S. star Duane Cole in a Cessna A150 Aerobat, a polished performance by Alan Lurie in a Spitfire IX, and extensive participation by the S.A.A.F.

The latter included a No. 19 Squadron Puma, No. 4 Squadron Bosbok, mass drop of sixty paratroops from a No. 28 Squadron Transall, C.F.S. Harvard, No. 4 Squadron Impala Mk. 1, No. 2 Squadron Mirage IIICZ, No. 24 Squadron Buccaneer S.50, and "The Silver Falcons"—the S.A.A.F.'s aerobatic team on Impala Mk. 1s—which brought each day's flying to a close. Other S.A.A.F. types on static display included a Canberra T.4, Kudu and Albatross (Piaggio P.166M); and there were also aircraft from the S.A.A.F. Museum's collection on show.



English Electric Canberra T.4 of No. 12 Squadron sported a PR finish. Three were delivered to the S.A.A.F. in 1963 and still serve alongside the Canberra B(I).12



Lockheed PV1 Ventura 6487 has been restored to the VIP state it had when used by General Smuts. Behind is a Lockheed Lodestar restored by South African Airways

Above: *North American Harvard 7662, seen running up, is one of about 100 still used by the S.A.A.F. for training, out of more than 700 supplied from 1943 onwards*

Above: *Beechcraft Duchess N6022J, c/n. ME167, first of its type in Southern Africa, arrived just in time for the show*

Below: *Piper Tomahawk ZS-KHY formed part of the Placo display*

Below: *Beautifully finished Vansin ultra-light, ZS-UJT, designed by Carel van Aswegen, is powered by a 160-h.p. Lycoming O-320*

YOUNG MEN REQUIRED FOR SUPERSONIC BATTLE OF WITS.

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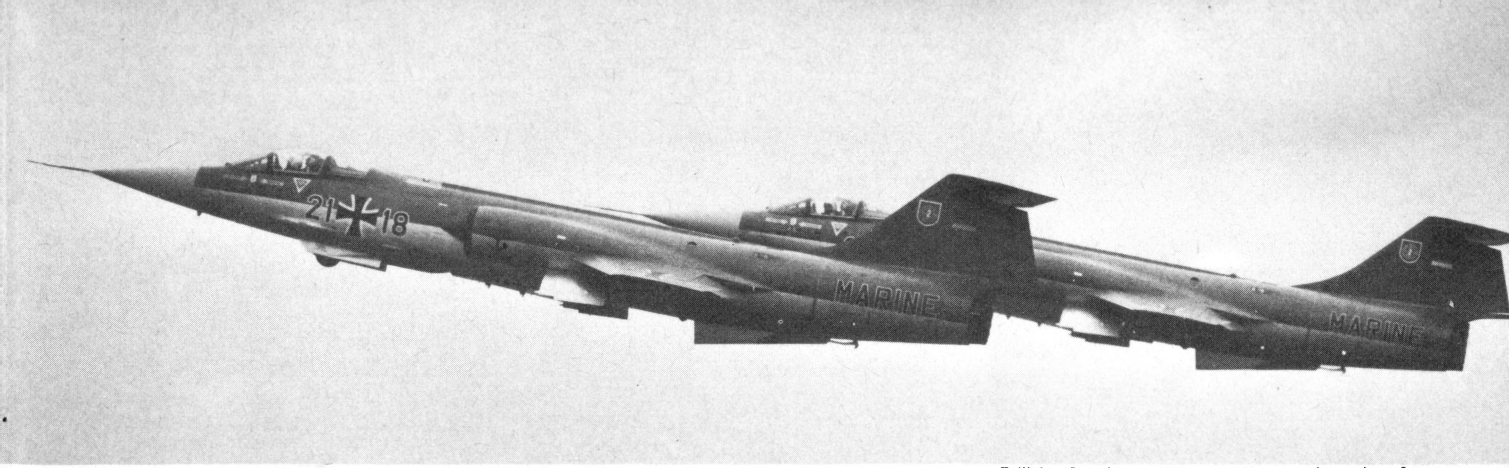


Still by far the most numerous combat aircraft type in NATO's inventory is the Lockheed F-104 Starfighter. These two F-104Gs belong to MFG 2 of the West German Navy, which will be the first air arm to re-equip with the Panavia Tornado (Photo: Brian M. Service)

NATO Air Power

Its task, organisation and equipment—in 30th anniversary year

by VICTOR FLINTHAM

THE NORTH Atlantic Treaty was signed on 4th April 1949 by ten European countries plus Canada and the United States. The original European signatories—Belgium, Britain, Denmark, France, Iceland, Italy, Luxembourg, Netherlands, Norway and Portugal—were joined in 1952 by Greece and Turkey and in 1955 by West Germany. The Atlantic Alliance finds expression in NATO, with headquarters in Brussels, and represents a commitment to consult where the security of any signatory is threatened. An armed attack against one member will be regarded as an attack against all, to be met if necessary with armed force. The treaty specifically refers however to armed aggression in *Europe*.

Governing body of NATO is the North Atlantic Council comprising Ministers of the signatories, together with their permanent ambassadors. Most of the members, with the exception of France and Greece, are committed to an integrated military organisation whereby part or all of the members' armed forces are earmarked or assigned to specific commands within the organisation. The Council's intentions in military issues are referred to its military commanders through the Military Committee which comprises member nations' Chiefs of Staff, except those of Iceland—which has no military forces—and France which maintains a liaison staff only.*

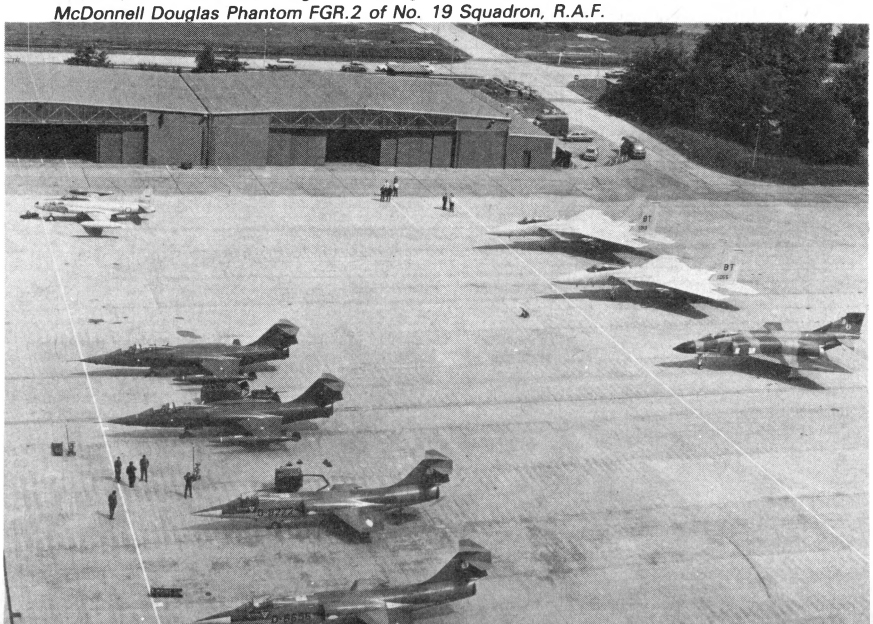
Although members are bound to one another they do not lose their rights to act independently and retain total sovereignty. In theory NATO exercises no control over the military activities of members outside Europe or in internal issues, and exists in reality to protect Western Europe and North America against Soviet or Warsaw Pact aggression. The Warsaw Pact is a multi-lateral military alliance between the Soviet Union, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland and Romania. The Soviet Union is also linked bilaterally with each of the WarPac countries and maintains forces in Czechoslovakia, East Germany, Hungary and Poland.

NATO—command structure

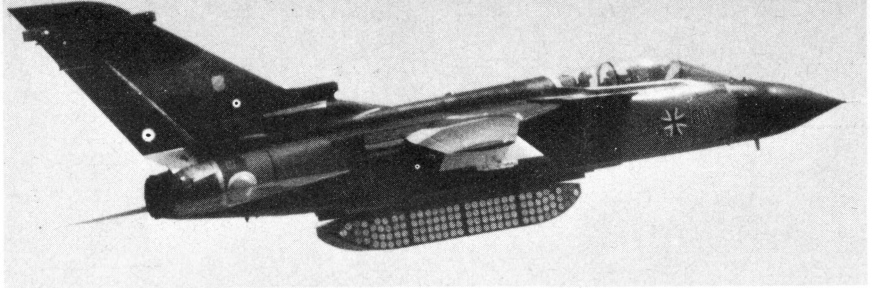
To meet the assumed WarPac threat NATO operates through three commands. The largest command is concerned essentially with the defence of Western and Southern Europe, while the remaining commands are primarily naval and relate to protecting sea communications in the Atlantic and maintaining control of the English Channel. Allied Command Europe (ACE) is commanded by the Supreme Allied Commander Europe (SACEUR), who is the Commander-in-Chief, U.S. Forces in Europe; the Deputy SACEUR is British. The Supreme Headquarters Allied Powers Europe (SHAPE) is at Mons in Belgium. Responsibilities of SACEUR extend to the defence of all NATO territory in Europe except Britain (air defence only), France, Iceland and Portugal. To meet these responsibilities ACE operates through subordinate commands—three geographical and two functional.

Allied Forces Northern Europe (AFNORTH—H.Q. Kolsaas, Norway) covers Norway, Denmark, the Baltic and Schleswig-Holstein in northernmost Germany. There is no fully integrated air command but the air forces of Norway and Denmark and the naval

Representatives of five nations at R.A.F. Wildenrath, West Germany (clockwise from bottom left): two F-104G Starfighters of No. 322 Squadron, R. Netherlands A.F.; two TF-104Gs of No. 726 Squadron, R. Danish A.F.; a Lockheed T-33 of the French A.F.'s 2e Escadre; *two McDonnell Douglas F-15 Eagles of the U.S.A.F.'s 36th TFW; and a resident McDonnell Douglas Phantom FGR.2 of No. 19 Squadron, R.A.F.*



* Luxembourg, although possessing an army, has no air force.



Tornado pre-series aircraft No. 11 carrying Messerschmitt-Bölkow-Blohm's MW1 "munitions dispenser". A total of 809 Tornadoes is being built for the R.A.F. (385), Luftwaffe (212), German Navy (112), and Italian A.F. (100)

NATO air power . . . (page 340)

air arm of the Federal Republic of Germany are committed to AFNORTH.

Allied Forces Central Europe (AFCENT—H.Q. Brunssum, Netherlands) is responsible for central Western Europe in depth from Germany westwards. Allied Air Forces Central Europe (AAFCE) controls the 2nd and 4th Allied Tactical Air Forces operating north and south of a Gottingen-Liège axis respectively. The 2nd ATAF comprises R.A.F. Germany, the Belgian and Dutch Air Forces and part of the West German Air Force; 4th ATAF comprises the U.S. 3rd and 17th Air Forces, a component from the Canadian Armed Forces and the balance of the West German Air Force.

Defence of Southern Europe is the role of Allied Forces Southern Europe (AFSOUTH—H.Q. Naples, Italy). Component air forces are the United States 16th (Spain) and Italian Air Force (5th ATAF) and the Greek and Turkish Air Forces (6th ATAF). Also attached to AFSOUTH is the U.S. Sixth Fleet, which includes two aircraft-carriers. A functional command of Naval Forces South (NAVSOUTH) is Maritime Air Forces Mediterranean (MARAIRMED), consisting of shore-based maritime patrol aircraft operating in the "Med." from Britain, France, the U.S.A. and Italy.

Having described ACE's three major territorial divisions, it remains to describe the two "functional" commands. The larger is United Kingdom Air Forces (UKAIR—H.Q. High Wycombe, England) which comprises most of the home-based R.A.F. operational units; it includes the U.K. Air Defence Region—in effect, No. 11 Group, R.A.F. Strike Command. The other NATO command is the ACE Mobile Force (AMF—H.Q. Seckenheim, West Germany). The Mobile Force is constituted especially to provide rapid reinforcement of the Northern or South-Eastern flanks. The seven infantry battalion groups are supported by helicopter detachments and close-support fighter squadrons.

NATO's two primarily naval commands also incorporate air elements. Allied Command Atlantic (ACLANT—H.Q. Norfolk, Virginia, U.S.A.) is responsible for policing the whole of the Atlantic north of the equator. Apart from a small standing force, no units are assigned in peacetime; in the event of war, however, the Striking Fleet Atlantic would bring to bear the combined air strength of the four carriers normally assigned to the U.S. Second Fleet. Patrol aircraft from the U.S.A., Canada, Norway, the Netherlands and Britain would also be assigned, together with maritime reconnaissance and strike aircraft.

The third and smallest command is Allied Command Channel (ACCHAN—H.Q. Northwood, England), which again comprises only a small standing force in peacetime. With the outbreak of hostilities air patrol and attack units would be assigned.

The total air power that can be brought to bear in the three major NATO commands—ACE, ACLANT and ACCHAN—is considerable. Although quantitively inferior to the threat it is designed to meet, the command structure offers a high degree of mobility and flexibility with the prospect of bringing the right equipment into action at the right place and at the right time.

The assumed threat

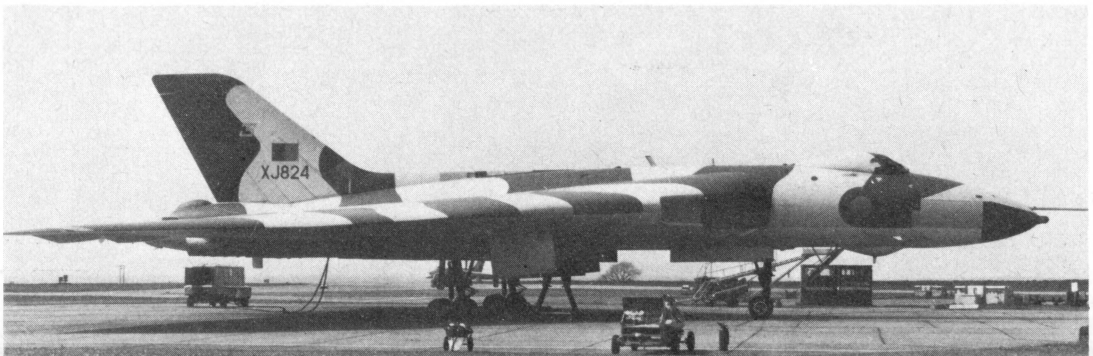
NATO's response to the Soviet threat developed through the 1950s to the so-called "nuclear tripwire" strategy. This meant building up the widest range of nuclear weaponry, both strategic and theatre, which would be unleashed in immediate and devastating retaliation in the event of WarPac attack. The Americans especially strove to keep ahead of the Russians quantitively and qualitatively; the arms race was on.

But the inflexible nuclear response was found failing in the early 1960s with Russian parity, at least in quantity. With the Berlin Wall Crisis in 1961 (see *Air Pictorial,* July 1979) President Kennedy faced a developing Soviet intimidation—almost a taunting—which could hardly have merited the devastation of all-out nuclear war.

With NATO's emphasis on nuclear strike, conventional tactical weaponry had been sacrificed and the position in Europe could only be strengthened, so far as air power was concerned, by rapid reinforcement through Air National Guard Units from the continental United States. By 1967 the NATO strategy had changed to "the flexible and appropriate response". While the superpowers continued to build up strategic nuclear forces, NATO concentrated on structuring its resources to meet anything from an isolated border incident to global conflict, but with the emphasis on a conventional response to a conventional Soviet threat.

In recent years WarPac has dramatically increased the quantity of armour in central Europe, especially in East Germany and Poland. Similarly large numbers of ground-attack aircraft have been assigned. This build-up represents a change of WarPac posture from the defensive to the obviously offensive. Ratios of the order of 2.5:1 in favour of WarPac both in armour and aircraft now provide the Soviets with the means to launch an instant attack, without the warning that NATO would be given if substantial front-line reinforcement was necessary before an attack could be initiated.

NATO's disposition of forces is a reflection of the assumption that hostilities would be focused on an armoured thrust in depth across the North German plain or further south through the Fulda Gap. Such a thrust would have to be contained before it could gain momentum, leaving little scope for a NATO tactical withdrawal. With a potential WarPac advance rate of 25–30 miles a day, any advance would have to be slowed down within several days at the most and halted within a week.



R.A.F. Avro Vulcan B.2 of No. 35 Squadron, Scampton. The Vulcan is one of five R.A.F. types which will eventually be replaced by the Tornado, the others being the Buccaneer, Canberra, Lightning and Phantom (Photo: J. D. R. Rawlings)

The prospect of a surprise attack, possibly without warning even through political intelligence, makes rapid reinforcement essential. Not only does NATO need a large airlift capability; the integrity of the U.K. as a rear base—a forward staging post relative to the U.S.A.—must be maintained. U.K. air defence therefore needs constant attention, especially since the Soviets are not now limited to attack from the east; the back door could be wide open to long-range attack aircraft flying around—or even across—Norway.

The Atlantic sea lanes are also vital for European survival with such a heavy NATO dependence on the U.S.A. In order to gain and retain control of the North Atlantic the Soviets might try to capture the Norwegian ice-free ports; the ACE Mobile Force exercises regularly in northern Norway to ensure that rapid reinforcement could be provided. Allied Forces North and Allied Command Channel would have a major task in countering the Soviet Northern Fleet.

Air striking power in Southern Europe is in part in the hands of the U.S. Sixth Fleet, in peacetime normally operating in the western Mediterranean while the Russian Black Sea Fleet operates at the eastern end. Massive land attack in southern Europe seems less likely and for either side would mean a large commitment of men and machines for relatively little territorial advantage. The so-called "soft underbelly" of NATO is equally the soft underbelly of the U.S.S.R. and this area may provide the easiest access for strategic air strikes on Soviet industry. NATO air components in Southern Europe will be concerned with local air defence, ground-attack in support of limited actions and, perhaps most importantly, in maritime patrol and strike in order to negate the value of the Russian Black Sea Fleet.

Indicative of the striking power at the disposal of the U.S. Sixth Fleet, this shot shows Grumman A-6E Intruders and EA-6B Prowlers, Vought A-7B Corsair IIs and Grumman F-14a Tomcats aboard the U.S.S. "John F. Kennedy" (CV-67) during her fifth operational deployment in the Mediterranean (Photo: Brian M. Service)

Problems for both sides

A problem constantly facing a consortium of sovereign states is that of the political intention and will of the constituents. Members can and do act independently and unilaterally.

Several years ago Greece and Turkey were to all intents at war with each other over Cyprus and the wounds are slow in healing. In 1973 the U.S. Government brought its troops to a high state of readiness during the Egyptian-Israeli conflict without advance warning to its NATO partners. As recently as January of this year, a U.S.A.F. squadron of McDonnell Douglas F-15 fighters of the 1st TFW based at Langley AFB was despatched to Saudi Arabia during the Iranian revolution. Field Commanders who normally maintain excellent working relationships with their colleagues are not infrequently embarrassed by the actions or expression of their own governments.

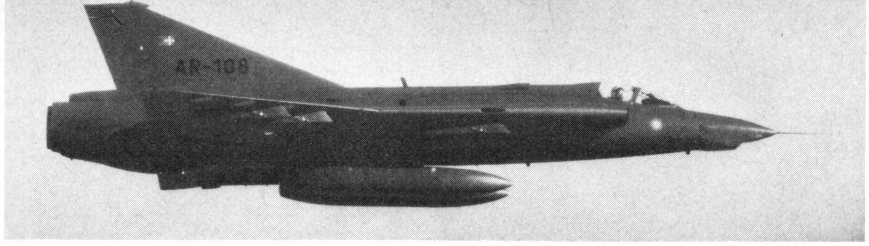
Some NATO signatories have reduced their armed forces to desperately low levels—including Britain. Canada, Denmark and Holland are also below strength and all these three countries are committed to conventional weapons only. Portugal's present contribution to the Alliance must be seriously questioned.

National independence and ambition have also bedevilled the prospect of equipment rationalisation; the constituent air forces operate two dozen different major combat types with an almost infinite variety of support and second-line types. Attempts to introduce standardisation of aircraft types have been dominated by the Americans, who seem sometimes to be rather slow in learning lessons. The General Dynamics F-16 package may have seemed financially attractive to the four NATO countries who are jointly involved, but the Soviets are unlikely to start World War III with a leisurely drive into Western Europe under cloudless blue skies for the benefit of such fair weather aircraft as the F-16 or Fairchild A-10.

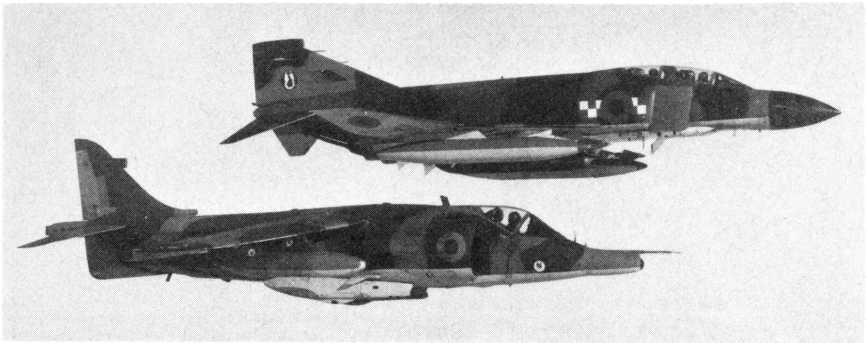
At the other extreme, attempts to produce types suitable for the anticipated range of roles demanded, such as the Panavia Tornado, result in a product beyond the pockets of NATO's smaller members. Although standardisation is taken seriously and there are constant improvements, the national arms industries are in competition in a lucrative market and are encouraged to maintain diversity by their own governments.

Geographical problems have already been touched upon, but it bears repeating that NATO has to maintain a purely defensive posture—with offensive capability—over a 4,000-mile front in a constant state of readiness. In recent years the problem has been eased by

Left: *First single-seat General Dynamics F-16A fighter for the R. Netherlands A.F., which earlier in June had taken delivery of its first two-seat F-16B. Three other NATO European air forces have selected the F-16—those of Belgium, Denmark and Norway.* Right: *A Fairchild A-10A Thunderbolt II "tank-buster" of the U.S.A.F., armed with a 4,000-r.p.m. 30-mm. multi-barrel cannon (Photo: J. D. R. Rawlings)*



Reconnaissance SAAB RF-35 Draken of No. 729 Squadron, R. Danish A.F.



R.A.F. Germany air-defence Phantom FGR. 2 of No. 19 Squadron, Wildenrath, and close air support Hawker Siddeley Harrier GR.3 (with laser nose) of No. 3 Squadron Gütersloh

NATO air power . . .

the establishment of the NATO Air Defence Ground Environment system (NADGE), a series of eighty-four electronically interfaced radar sites linked through six centres to provide up to the minute information on attacks *in progress.* The situation will be further improved with the commissioning of the systems-compatible Boeing E-3As of NATO and the U.S.A.F. and the Nimrod AEW.3s of the R.A.F. in the airborne early warning role.

NATO, of course, is not alone in having problems. Although WarPac has overcome the equipment standardisation issue—in the case of combat aircraft by reliance on Russian types—it suffers several features that seriously limit its effectiveness. The biggest single issue must be broadly the will to fight.

First, WarPac forces are established upon conscription, whereas most NATO powers rely on a professional volunteer force or a combination of the latter with enlistment. Secondly, the Russians must be permanently concerned about relationships with their satellites. The response to the Pope's recent visit to Poland emphasises the spirit of independence that continues to obtain despite the harsh experiences of Hungary and Czechoslovakia. Many Soviet conscripts would be tied down on internal security duties in time of war.

Thirdly, there are problems of loyalty within Russia, which is a Union of States, very different in culture and history. Many Russian military units are of mixed races or sub-races in order to minimise the prospect of revolt by regional forces. This leads to lowered morale, distrust and not least a language problem.

Another problem for WarPac forces is a very rigid command structure with a consequentially slow response rate, which would place units at a disadvantage when engaged with more flexibly managed NATO resources.

In the final analysis, however, it is WarPac that retains the advantage in Europe. NATO has to prepare for a war which will be started without warning—political or military—by an enemy with excellent lines of communication and sufficient strength to mount a number of attacks over a broad front from a very wide range of options.

Air roles

The traditional designations of military aircraft as fighters, bombers and so on is meaningless in the context of modern air warfare. The NATO air forces are equipped to respond flexibly and although many units are trained to operate in a primary role, a "fighter" squadron may find itself operating in close air support, interdiction, counter-air or even nuclear strike roles. An indication of the range of aircraft roles is set out below:

Reconnaissance.—Each NATO air arm has a tactical reconnaissance element, critical if the course of battle and location of targets are to be followed and maintained. Types used for tactical reconnaissance are generally adaptations of fighter types and within NATO include the McDonnell Douglas RF-4C/E Phantom, Northrop RF-5A, Lockheed RF-104G Starfighter, SAAB RF-35, Sepecat Jaguar GR.1, Dassault Mirage 5BR and Fiat G.91R. In addition to tactical reconnaissance (TR), the R.A.F. and U.S.A.F. maintain strategic reconnaissance (SR) and maritime reconnaissance (MR), using types such as the Avro Vulcan SR.2, English Electric Canberra and its RB-57 U.S. version, Lockheed U-2 and Lockheed SR-71.

Close air support.—Working on the front line demands highly developed skills, and a number of units, especially of 2nd and 4th ATAF, are designated for close support work, effectively acting as short- to medium-range artillery, taking out targets determined by the Army. Hawker Siddeley Harrier, Sepecat Jaguar and Fairchild A-10 Thunderbolt II units operate in the close air support role.

Counter-air.—To reduce enemy air effectiveness, both defensive and offensive, particular attention is given to counter-air operations. There are three main ways of reducing relative enemy air power—apart from striking at source by bombing factories, etc.

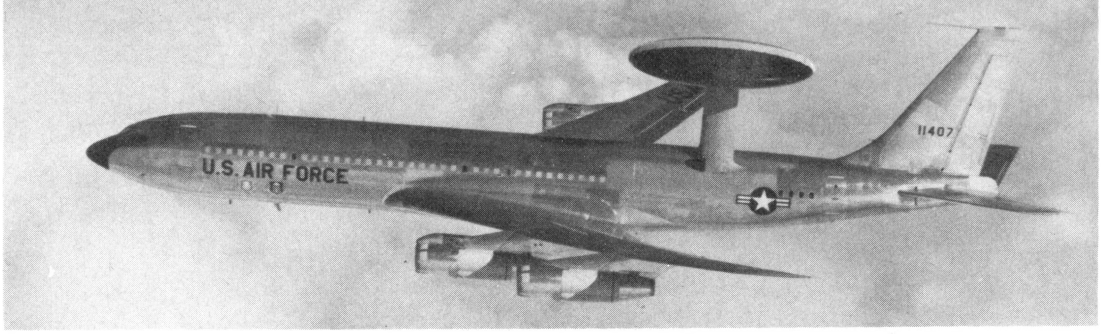
The first is to prevent the aircraft from flying by attacking, on the ground, aircraft, fuel, munitions, personnel and runways. The NATO approach is to concentrate on runways, whereas it is believed that WarPac will favour attacking personnel by means of nuclear, chemical and biological warfare (NCBW). For this reason frequent exercises are held at R.A.F. Germany bases in full NCBW protective gear to ensure that response time and maintenance schedules can be maintained.

The second counter-air approach is to meet the enemy in the sky and better him; while the third is to concentrate on his air defence system and minimise the effectiveness of radars, guns and missiles.

NATO types assigned to counter-air roles would include the F-104 Starfighter, McDonnell Douglas F-4 Phantom, Northrop F-5, General Dynamics F-111, McDonnell Douglas F-15 Eagle, SAAB F-35 Draken, North American F-100 Super Sabre, Dassault Mirage 5, Vought A-7 Corsair II, Jaguar GR.1 and Fiat G.91.

Interdiction.—A major problem for NATO if confronted by a massive

Maritime-reconnaissance Hawker Siddeley Nimrod MR.1 of No. 42 Squadron, R.A.F. Eleven Nimrod AEW.3s are being built to replace Shackletons for airborne early warning



The Boeing E-3A Sentry AWACS aircraft —Airborne Warning and Control System. Nineteen E-3As are already in service with the U.S.A.F., some of them detached to Iceland, and NATO air forces have jointly ordered a further eighteen

armoured thrust would be not just to stop it, but to stop it quickly. Not only is there little room for manoeuvre in densely populated north-western Europe but successful movement forward by WarPac would sever NATO communications and supply lines which tend to run parallel to the front rather than at right-angles to it.

Part of the NATO effort, given a frontal attack, would be to prevent the enemy's forward units gaining momentum by supply—and reinforcement—denial, or interdiction. Based on effective reconnaissance, medium-range light strike units would attack supply columns, stores and marshalling areas. Units flying these types of missions would be particularly necessary in AIRCENT (2nd and 4th ATAFs) and types used would include the F-4 Phantom, F-104 Starfighter, F-111, Jaguar GR.1 and Hawker Siddeley Buccaneer S.2.

Since components of transport systems such as bridges would be specially attractive targets, weapons used would include precision-guided munitions (PGM) or "smart" bombs which are reported to offer 100 times the effectiveness of conventional free-falling bombs.

Strike.—Several air forces maintain a medium-range strike capability which could be assigned to NATO and applied against strategic targets. R.A.F. Vulcans and Buccaneers would operate in this mode, as would U.S.A.F. Boeing B-52s and General Dynamics FB-111As using conventional or nuclear weapons, although in NATO terms "strike" refers specifically to nuclear attack.

Electronic warfare.—The Soviets have installed a highly effective anti-aircraft system to cope with threats at all levels. Defence of the U.S.S.R. itself is based upon a combination of air-to-air missiles and such refined interceptors as the Su-15, MiG-23, MiG-25 and the longer-range Tu-28P controlled by the Tu-126 AWACS aircraft.

Forward defence in the WarPac area is maintained by an interceptor force of the older and short-duration MiG-21 and the combination of SA-7 surface to air missile, ZSU-23-4 quad self-propelled anti-aircraft gun system, and SA-6 surface to air missile operated by army units plus air force SA-2 high-level surface to air missiles.

These complex defence systems represent a lethal barrier for aircraft

NATO COMBAT AIRCRAFT STRENGTHS (front-line only)

	Norway	Denmark	Netherlands	Belgium	R.A.F. Germany	R.A.F. U.K.	W. Germany	USAFE	Canada	Italy	Greece	Turkey	Portugal	U.S. 6th Fleet	U.S. 2nd Fleet	Totals	
PR																	
RF-5	10										12	36				58	
RF-35		20														20	
RF-104			18				24			36						78	
Mirage 5BR				18												18	374
Jaguar R.					15	15										30	
Canberra						22										22	
Vulcan SR.2						10										10	
RF-4							60	66			12					138	
GA																	
F-5	44		72									100				216	
F-35		20														20	
F-100		36										80				116	
F-104			36	36			144		48	84	18	32				398	
Mirage 5				54												54	
Jaguar					60	30										90	1,846
Harrier					36	18										54	
F-4							60	192			36					288	
G.91							60			82			18			160	
F-111								168								168	
A-10								48								48	
A-6/A-7											54			60	120	234	
AD																	
F-104	24	36	36	36						36		32				200	
F-4					24	60	60									144	
Lightning						24										24	
F-15								90								90	737
F-14														60	120	180	
Mirage F 1											36					36	
F-5											45					45	
F-86													18			18	
S & MS																	
F-104	20						72									92	
Buccaneer					24	30										54	194
Vulcan						48										48	
Total	98	112	162	144	159	257	480	564	48	238	213	280	36	120	240	Total	3,151

Note: These figures of operational combat aircraft are considerably less than those commonly quoted. Comparative figures from "The Military Balance 1978-79" are as follows (in each case U.S. carrier-based aircraft are omitted).

	Military Balance	*Air Pictorial*	*Difference*
PR	470	374	96
GA	2,028	1,666	362
AD	655	557	98
S*	160	146	14
	3,313	2,743	570

* Excluding R.A.F. Vulcans.

Two R.A.F. Hawker Siddeley Buccaneer S.2B strike aircraft of No. 15 Squadron, Laarbruch, Germany, sweep low over Holland during a training sortie

Left: *Dassault Mirage 5BA and two-seat Mirage 5BD of No. 8 Squadron, Belgian A.F.* Right: *Northrop F-5A of the R. Norwegian A.F.*

NATO air power . . . (page 344)

flying at all levels and following experience of the Americans in Vietnam and the Israelis in 1973, highly refined electronic counter-measures are now employed.

Most NATO combat aircraft are equipped with sensors and limited counter-measures, but several units are specifically designated and equipped for this work. Forward "Wild Weasel" units of USAFE fly the F-4G Phantom, while the Canberra and F-104 also operate in the electronic counter-measures role. A wide variety of aircraft is employed in data gathering, including the Lockheed EC-130 Hercules, Canberra, Nimrod R.1, Piaggio PD.808 and Boeing EC-135.

Air defence.—Several surface to air missile systems are employed by NATO armies for local air defence; air force-operated SAM systems include Hawk, Nike-Hercules and Bloodhound. Emphasis is still placed on the flexibility of the manned interceptor and all NATO air arms operate aircraft specifically in the air defence role to meet the threat of incoming enemy aircraft. Aircraft used in this role include the Phantom FGR.2, F-4F Phantom, BAC Lightning, F-104G/S Starfighter, Dassault Mirage F 1, Northrop F-5A and F-15 Eagle.

Airborne early warning.—With the air forces of both sides concentrating on low-level intrusion of hostile airspace there is a need for early warning of impending attack and subsequent control of interception. Ground radar range for an aircraft flying at 500 ft. is about 30 miles and the need can only be met

COMBAT AIRCRAFT CHARACTERISTICS

Type	*Role**	*Max. T.O. weight (kg.)*	*Span (m.)*	*Length (m.)*	*T.O. run loaded (m.)*	*Load (kg.)*	*Max. speed (Mach)*	*Combat† radius (km.)*	*Ceiling (m.)*
Lightning F.6	AD	21,800	10.61	16.84	1,200	910	2.0	740	17,400
Mirage F 1C	AD	14,900	8.40	15.00	640	4,000	2.2	740	20,000
F-15A	AD	18,824	13.05	19.43	274	7,257	2.5	1,100	30,000
F-5A	AD, GA, PR	9,379	7.70	14.38	800	3,175	1.1	346	15,400
F-104G	AD, GA, PR	14,060	6.68	16.69	902	1,815	2.2	1,200	17,700
F-4E	AD, GA, PR	26,035	11.71	19.20	1,525	7,250	2.2	1,450	17700
Harrier GR.3	GA	11,339	7.70	13.87	150	2,270	0.96	540	15,250
F-100D	GA	15,800	11.81	16.54	1,600	3,402	1.2	1,100	13,700
A-7H	GA	19,050	11.80	14.06	1,525	6,805	0.95	825	12,500
A-10A	GA	21,500	17.53	16.26	1,152	7,257	0.65	1,000	13,700
F-111F	GA	45,359	19.20	22.40	915	14,872	2.2	1,700	18,300
G.91	GA, PR	8,700	9.01	11.67	914	1,815	0.95	600	12,500
Mirage 5	GA, PR	13,500	8.22	15.55	700	1,815	2.02	1,300	17,000
Jaguar GR.1	GA, PR	15,500	8.69	15.52	880	4,535	1.4	850	14,650
SAAB-35XD	GA, PR	16,000	9.40	15.35	650	4,085	2.0	635	16,750
Buccaneer S.2	S	28,123	13.41	19.33	720	7,257	0.95	1,500	12,200
Vulcan B.2	S	81,645	33.83	30.45	2,200	9,534	0.93	2,780	16,750

* As generally applied within NATO.

† Related to load shown.

Left: *North American F-100C Super Sabre of the Turkish A.F. which operates five squadrons with this type (Photo: Aviation Photos International).* Right: *BAC Lightning F.6 of No. 5 Squadron, R.A.F., based at Binbrook with similarly equipped No. 11 Squadron*

within existing technology by airborne detection and control systems.

The combined NATO air forces have ordered eighteen Boeing E-3A Sentry Airborne Warning and Control System (AWACS) aircraft which should be systems-compatible with the eleven Hawker Siddeley Nimrod AEW.3s ordered for the R.A.F. in the AEW role. The U.S.A.F. already operates nineteen E-3As, some replacing the elderly Lockheed EC-121Ts based in Iceland, while the R.A.F. uses ten Avro Shackleton AEW.2s pending delivery of the Nimrods.

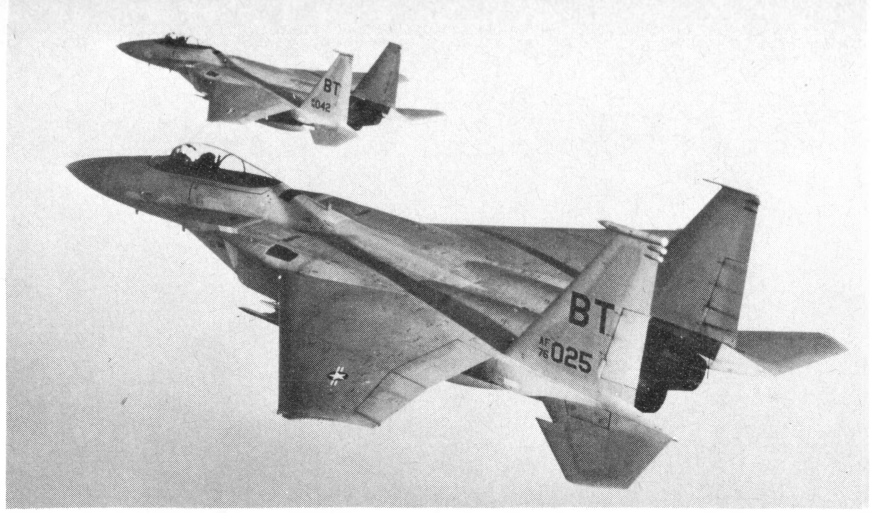
Flight-refuelling.—Fighter aircraft, especially interceptors, suffer from relatively short range. Those nations with extensive shorelines to protect require an air-refuelling capability to ensure particularly that interceptors are able to identify and deal with targets at long distances from base. In-flight refuelling is not, of course, confined to short-range interceptors and many other types, especially those in R.A.F. and U.S.A.F. service, employ this means of increasing their combat radius or for ferry flights between distant bases. However, a string of tankers may act as signposts to a potential target for air attack—or they might just represent a relatively inexpensive feint.

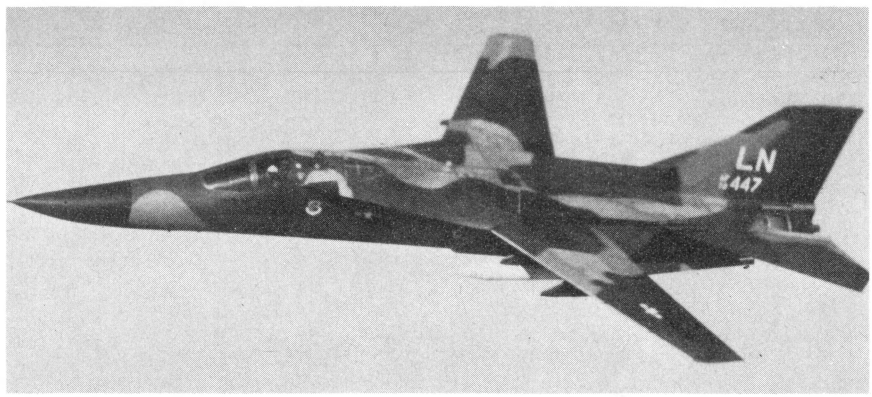
The R.A.F. uses Handley Page Victor K.2s, to be supplemented by nine Vickers VC10s; the U.S.A.F. operates Boeing KC-135s based in Britain, West Germany and Spain on rotation from units in the United States.

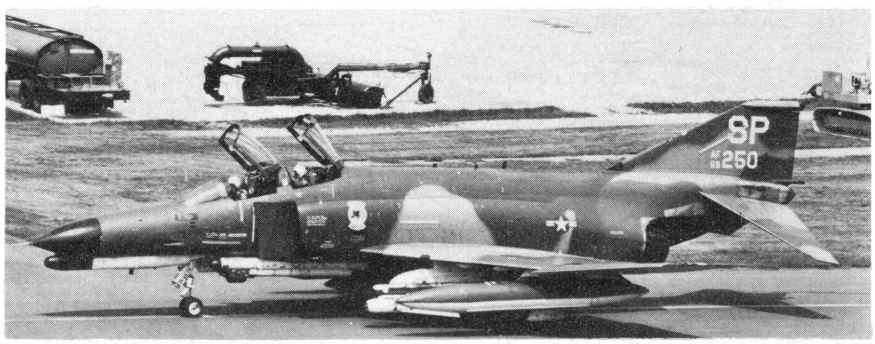
Maritime patrol and search.—With the enormous strength of the Soviet submarine fleets, a high priority is attached in NATO to anti-submarine work. There is also the need for sea search to locate and identify enemy surface vessels; the Soviet Navy is now strong in most warship categories and, in addition, is capable of mounting large-scale amphibious assault operations, always a possibility in the Baltic, for example.

Not only are aircraft and helicopters used in these roles by NATO ship-based units, but air forces and naval air arms operate a range of land-based patrol and attack aircraft, including the Lockheed P-3B/C Orion, Nimrod MR.1, Breguet Atlantic, Grumman S-2E Tracker and Lockheed SP-2H Neptune.

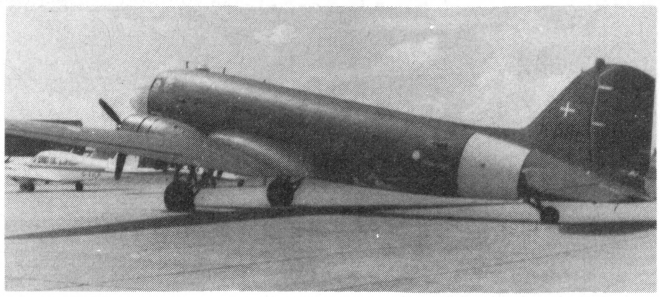
Maritime strike.—In time of war the Western European nations would be highly dependent upon reinforcement and re-supply by sea. A number of NATO air forces have designated shore-







Top to Bottom: *Two F-15A Eagles of the U.S.A.F.'s 36th TFW, Bitburg, Germany. Swing-wing U.S.A.F. General Dynamics F-111F of the 48th TFW, Lakenheath, England.* Luftwaffe *Fiat G.91R of* LeKG 43, *Oldenburg, Germany (Photo: J. D. R. Rawlings). U.S.A.F. "Wild Weasel" F-4G Phantom of the 81st TFS, 52nd TFW, Spangdahlem, Germany. Canadair-built CF-104 Starfighter of the Canadian A.F.'s 1st Air Group, Baden-Soellingen, Germany*



Left: *In Denmark the SAAB T-17 Supporter is used by the R. Danish A.F. for training and by the Army for observation*
Above: *Dakotas are still around—Douglas C-47 K-686 belongs to the R. Danish A.F.'s No. 721 Squadron (Author's photo)*

NATO air power . . .

based maritime strike units to attack warships threatening to cut off supplies by sea routes. More potent, perhaps, are carrier-based aircraft due to "base mobility". For those who can no longer afford the large and expensive, but undeniably powerful, aircraft-carriers, the Hawker Siddeley Sea Harrier operating from smaller ships must represent the best alternative for the immediate future.

NATO aircraft designated in the maritime strike role are the Buccaneer S.2 and F-104D/G Starfighter (shore-based) and F-4J Phantom, Grumman A-6B Intruder, Vought A-7B/E Corsair II and Sea Harrier (ship-based).

Search and rescue.—All NATO air forces and/or naval air arms operate aircraft, normally helicopters, in the search and rescue role. In wartime their function would be to find and retrieve Allied personnel adrift in the sea, usually following the crash of an aircraft. In peacetime much of the work is civilian orientated, providing useful practical experience and rendering a valuable service to the community.

Types most commonly used are the Westland Sea King, Sikorsky S-61 and HH-3 variants, Bell UH-1, Agusta-Bell AB.204 and AB.205 helicopters. The USAFE rescue and recovery units use Sikorsky HH-53C helicopters with the Lockheed HC-130N Hercules, while the only other fixed-wing type specifically used for SAR duties is the Grumman HU-16 Albatross amphibian. Maritime patrol aircraft are frequently used in the long-range search role following accidents at sea.

Airlift.—The rapid movement of men and material to meet attacks over a wide front dictates the need for a range of transport aircraft, both fixed-wing and helicopters. Foremost among types used is the ubiquitous C-130 Hercules in its 'E, 'H and 'K versions. Other aircraft include the Vickers VC10, Transall C-160, Fokker F.27 Troopship/Friendship, Nord Noratlas, Fiat G.222, Fairchild C-119 and the veteran Douglas C-47 Dakota. Helicopter types include the Westland Puma and Wessex with the Boeing-Vertol CH-147 Chinook on order for the R.A.F. and the CH-47 Chinook and Sikorsky CH-53 in use with the armies of several NATO members. Reinforcement into Europe from the U.S.A. would be moved largely by Lockheed C-141 StarLifter and C-5A Galaxy transports.

Communications and utility.—An even greater variety of aircraft, including helicopters, is used for support work and communications. Most widely used helicopters are the Bell UH-1, Agusta-Bell AB.204 and 205 range, with fixed-wing aircraft represented by such diverse types as the Boeing 737, BAC (Hunting) Pembroke, Hawker Siddeley HS 748, Dassault Falcon, D.H. Canada Twin Otter, Douglas C-47, de Havilland Devon, Lockheed C-140 Jet Star, Hamburger Flugzeugbau HFB 320, Canadair CL-215, Piaggio P-166 and Boeing 707.

* * *

Most of the weight of NATO air power is vested in its air forces, but the arrangements for managing naval and army aircraft vary from nation to nation. Naval units are described below whether maintained by the relevant air force or separately administered.

An exception is the U.S. Navy. A general indication of the strength of the air components of the U.S. Second (Atlantic) and Sixth (Mediterranean) Fleets only is given since units change frequently. It should also be noted that several U.S.N. P-3 units are based in Europe, also on a rotational basis.

In some of the smaller nations, army types are flown by the air force on a squadron basis; other countries attach machines to formations at varying levels so that army aircraft are generally shown only by type and number in service.

Apart from the general references made above, surface to air guided weapons have been omitted throughout the listings. The French Air Force is described in summary only, since France has placed her forces outside the integrated military command—and there was a comprehensive article on the French A.F. in the April 1978 issue.

Roles have been ascribed to units as carefully as possible, although some units would operate in several roles depending on circumstances. In drawing up abbreviations every effort has been made to avoid confusion, by using conventional classifications.

Operational units and strengths only are shown.

Lockheed P-3B Orion 600, one of five operated by No. 333 Squadron, R. Norwegian A.F.

UNIT DESIGNATIONS—ABBREVIATIONS

Tactical, strategic and maritime reconnaissance	PR
Close air support; counter-air; interdiction	GA
Strike	S
Electronic counter-measures; intelligence gathering	EW
Air Defence	AD
Airborne early warning; warning and control	AEW
Flight-refuelling	K
Maritime patrol; anti-submarine	AS
Maritime strike	MS
Search and rescue	SAR
Airlift	C
Communications; utility	U

NATO's Air Forces

NORWAY—Kongelige Norske Luftforsvaret (AFNORTH)

Squadron	*Type*	*Role*	*Establishment*	*Base*
336*	RF-5	PR		
	F-5A/B	GA	18	Rygge
338*	F-5A/B	GA	18	Ørland
718	F-5A/B	GA	18	Sola (F-5 O.C.U.)
331*	F-104G	AD	24	Bodø
333	P-3B	AS	5	Andøya
334*	F-104D	MS	20	Bodø
330	Sea King	SAR	9	Sola, Bodø, Ørland, Banak
720	UH-1B	SAR	6	Rygge
335	Falcon	EW	2	Gardemoen
	C-130H	C	6	,,
339	UH-1B	U	10	Bardufoss
719	Twin Otter	U	5	Bodø
	UH-1B	U	8	,,

Army operates 24 L-18 and 24 O-1.
* To re-equip with F-16 (72 ordered); 332 Sqn. to be the first.

DENMARK—Konelige Danske Flyvevaben (AFNORTH)

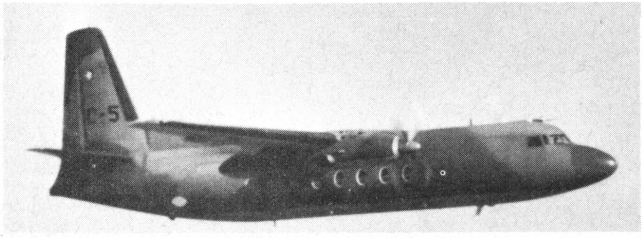
Sqn.	*Type*	*Role*	*Estab.*	*Base*
729	RF-35	PR	20	Karup
725	F-35	GA	20	Karup
727*	F-100D/F	GA	18	Skrydstrup
730*	F-100D/F	GA	18	Skrydstrup
Flt.	F-104G	EW	3	Aalborg
723	F-104G	AD	18	Aalborg
726	F-104G	AD	18	Aalborg
721	C-47	C	6	Vaerløse
	C-130H	C	3	,,
722	S-61A	SAR	8	Vaerløse, Aalborg, Skrydstrup
	Alouette III†	AS	8	Vaerløse

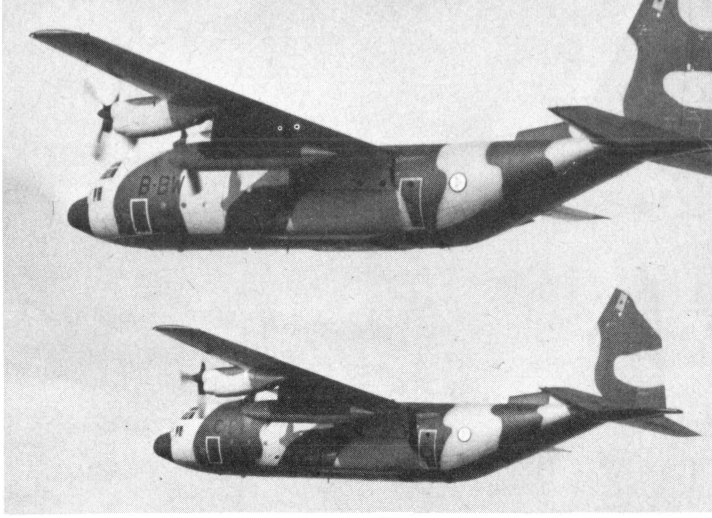
Army operates 15 OH-6A and 9 SAAB T-17.
* To re-equip with F-16 together with 724, 728 Sqns. (58 ordered).
† Operated by 722 Sqn. for Navy. Being replaced by 7 Lynx.

GERMANY (Naval Air Arm)—**Marineflieger** (AFNORTH)

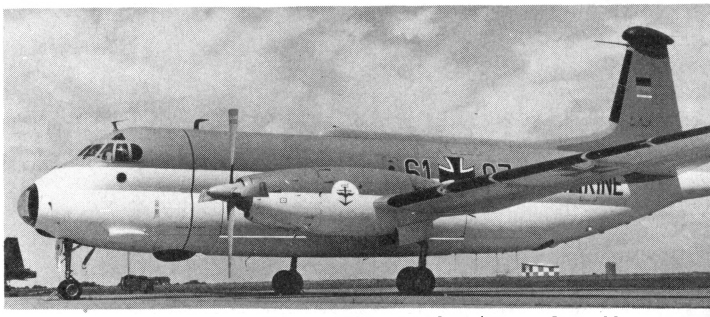
Wing	*Type*	*Role*	*Estab.*	*Base*
MFG 3	Atlantic	AS	18	Nordholz
MFG 1*	F-104G	MS	48	Kropp
MFG I/2*	RF-104G	PR	24	Aggebeck
MFG II/2*	F-104G	MS	24	Aggebeck
MFG I/5	Sea King	SAR	20	Kiel-Holtenau, Borkum, Heligoland, Sylt
MFG II/5	Do 28	U	20	Kiel
	H-34G	U	15	,,

The Army Air Arm (*Heeresflieger*) has 20 UH-1 and Alouette II assigned to AFNORTH.
* To re-equip with Tornado (112 ordered for *Marineflieger*). The MFG has 12 Lynx on order for type F122 frigates.





Lockheed C-130H Hercules of No. 335 Squadron, R. Norwegian A.F.



Breguet Atlantic of the German Navy's MFG 3 *(Photo: Brian M. Service)*

NETHERLANDS—Koninklijke Nederlandse Luchtmacht—AAFCE (2 ATAF)

Sqn.	*Type*	*Role*	*Estab.*	*Base*
306*	RF-104G	PR	18	Volkel
311*	F-104G	GA	18	Volkel
312*	F-104G	GA	18	Volkel
313	NF-5A	GA	18	Twenthe
315	NF-5B	GA	18	Twenthe (NF-5 O.C.U.)
314	NF-5A	GA	18	Eindhoven
316	NF-5A	GA	18	Gilze-Rijen
322*	F-104G	AD	18	Leeuwarden
323*	F-104G	AD	18	Leeuwarden
334	F.27M	C	12	Soesterberg

* To re-equip with F-16 (102 on order); 322 Sqn. to be the first.

Left: *Fokker F.27M Troopship of No. 334 Squadron, R. Netherlands A.F.* Below: *The R. Netherlands A.F.'s first General Dynamics F-16B, J-259, leads a pair of No. 322 Squadron F-104G Starfighters and two Northrops from No. 315 Squadron, two-seat NF-5B (nearer) and single-seat NF-5A*

Left: *Lockheed SP-2H Neptune of the Dutch Navy's No. 320 Squadron (Photo: Aviation Photos International).* Right: *All three Dutch Army units operate the Messerschmitt-Bölkow-Blohm BO 105 helicopter—this one belongs to No. 298 Squadron*

NATO air forces . . . (page 348)

NETHERLANDS (*continued*)

Naval Air Arm (*Marineluchtvaartdienst*)

320	SP-2H†	AS	12	De Kooy
321	Atlantic	AS	7	Valkenburg
860	Lynx	AS	10	Valkenburg
7	UH-1D, Lynx	SAR	6	De Kooy

Army Aviation (*Groep Lichte Vliegtuigen*)

298	BO 105	U	12	Soesterberg
299	BO 105, Alouette III	U	36	Deelen
300	BO 105, Alouette III	U	40	Deelen

† To re-equip with P-3C (13 on order).

BELGIUM—Force Aérienne Belge—AAFCE (2 ATAF)

Sqn.	*Type*	*Role*	*Estab.*	*Base*	
42	Mirage 5BR	PR	18	Florennes	2 Wing
2	Mirage 5BA	GA	18	Florennes	2 Wing
1	Mirage 5BA	GA	18	Bierset	3 Wing (Mirage O.C.U.)
8	Mirage 5BA/BD	GA	18	Bierset	3 Wing (Mirage O.C.U.)
23*	F-104G	GA	18	Kleine Brogel	10 Wing
31*	F-104G	GA	18	Kleine Brogel	10 Wing
349*	F-104G	AD	18	Beauvechain	1 Wing
350*	F-104G	AD	18	Beauvechain	1 Wing
—	Sea King, Alouette II	SAR	8	Koksijde	
20	C-130H	C	12	Melsbroek	15 Wing
21	Boeing 737, Mystere 20, HS 748, Merlin	U	13	Melsbroek	15 Wing

Belgian Army Aviation

16	Islander	U	12	Butzweilerhof
	Alouette II	U	15	"
17	Alouette II	U	33	Werl
18	Alouette II	U	30	Merzbruck

* To re-equip with F-16 (116 on order).

GREAT BRITAIN—Royal Air Force Germany—AAFCE (2 ATAF)

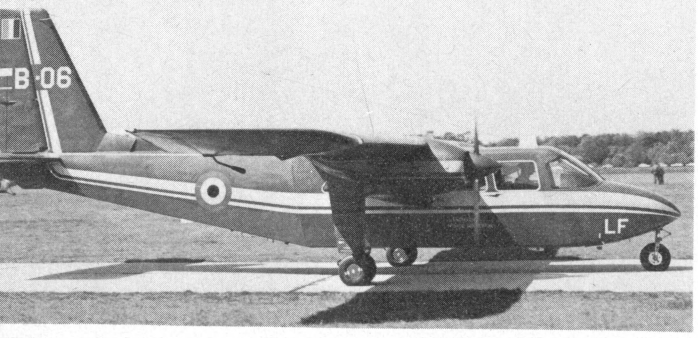
Sqn.	*Type*	*Role*	*Estab.*	*Base*
2	Jaguar GR.1	PR	15	Laarbruch
14	Jaguar GR.1	GA	15	Bruggen
17	Jaguar GR.1	GA	15	Bruggen
20	Jaguar GR.1	GA	15	Bruggen
31	Jaguar GR.1	GA	15	Bruggen
3	Harrier GR.3	GA	18	Gutersloh
4	Harrier GR.3	GA	18	Gutersloh
15*	Buccaneer S.2B	S	12	Laarbruch
16*	Buccaneer S.2B	S	12	Laarbruch
19*	Phantom FGR.2	AD	12	Wildenrath
92*	Phantom FGR.2	AD	12	Wildenrath
18	Wessex HC.2	C	16	Gutersloh
60	Pembroke C.1	U	9	Wildenrath

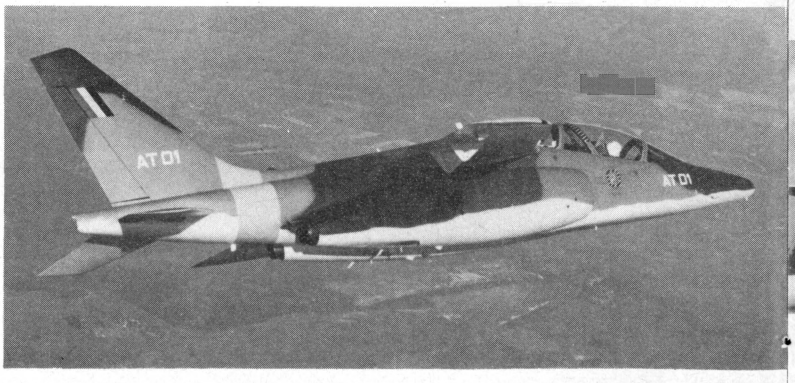
The Army operates about 40 Scout AH.1 with 651, 652, 653 and 659 Squadrons; 20 Lynx AH.1 with 654 Squadron; 80 Gazelle AH.1 with 661, 662, 663, 664 and 669 Squadrons, 7 and 12 Flts.

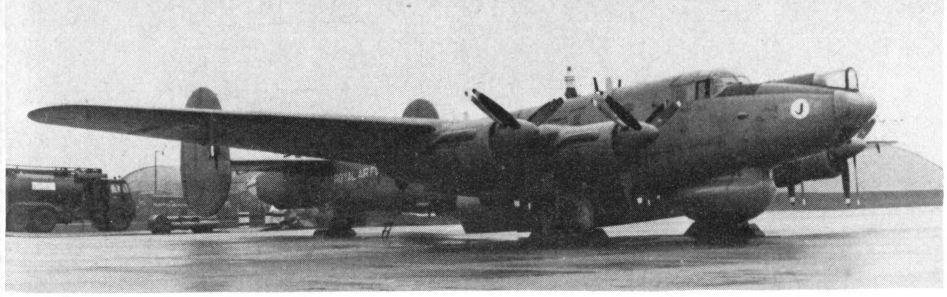
* To re-equip with Tornado (from total of 385 on order).

33 CH-147 Chinook ordered to supplement Wessex.

Below, Top Left: *Belgian Army Britten-Norman Islander of No. 16 Squadron (Photo: Aviation Photos International).* Right: *Belgian A.F. Dassault-Breguet/Dornier Alpha Jet.* Bottom: *Belgian A.F. Westland Sea King Mk. 48* (Left) *and Hawker Siddeley HS 748 Series 2A*







Left: *Avro Shackleton AEW.2 of No. 8 Squadron, R.A.F., Lossiemouth.* Right: *Sepecat Jaguar GR.1 of No. 2 Squadron, R.A.F., Laarbruch*

R.A.F. Strike Command—No. 38 Group (Potentially available to AMF)

Sqn.	*Type*	*Role*	*Estab.*	*Base*
41	Jaguar GR.1	PR	15	Coltishall
6	Jaguar GR.1	GA	15	Coltishall
54	Jaguar GR.1	GA	15	Coltishall
1	Harrier GR.3	GA	18	Wittering
24	Hercules C.1*	C	10	Lyneham
30	Hercules C.1*	C	10	Lyneham
47	Hercules C.1*	C	10	Lyneham
70	Hercules C.1*	C	10	Lyneham
10	VC10 C.1	C	11	Brize Norton
33	Puma HC.1†	C	12	Odiham
230	Puma HC.1	C	12	Odiham
72	Wessex HC.2	C	15	Odiham

The Army operates about 30 Scout AH.1, 10 Lynx AH.1, 70 Gazelle AH.1 and 12 Beaver AL.1 in 4 squadrons and 5 flts. in the U.K.

* 30 aircraft to be "stretched".

† Seven more Pumas on order.

R.A.F. Strike Command—No.1 Group (UKAIR)

Sqn.	*Type*	*Role*	*Estab.*	*Base*
13	Canberra PR.7*	PR	12	Wyton
39	Canberra PR.9*	PR	10	Wyton
27	Vulcan SR.2	PR	8	Scampton
9	Vulcan B.2*	S	8	Waddington
44	Vulcan B.2*	S	8	Waddington
50	Vulcan B.2*	S	8	Waddington
101	Vulcan B.2*	S	8	Waddington
35	Vulcan B.2*	S	8	Scampton
617	Vulcan B.2*	S	8	Scampton
208	Buccaneer S.2B*	S	10	Honington
51	Nimrod R.1	EW	3	Wyton
	Canberra B.6	EW	4	,,
360	Canberra T.17	EW	12	Wyton
55	Victor K.2†	K	10	Marham
57	Victor K.2†	K	10	Marham
12	Buccaneer S.2A*	MS	10	Honington (to Lossiemouth)
216	Buccaneer S.2A*	MS	10	Honington (to Lossiemouth)
7	Canberra TT.18	U	8	St. Mawgan
100	Canberra E.15	U	8	Marham
115	Andover E.3	U	6	Brize Norton
32	HS 125, Gazelle HC.4, Andover	U	7	Northolt
207	Devon	U	8	Northolt

* To re-equip with Tornado.

† To be supplemented by 9 VC10 tankers (probably 214 Sqn. re-formed).

R.A.F. Strike Command—No. 11 Group (UKAIR (UKADR))

Sqn.	*Type*	*Role*	*Estab.*	*Base*
5	Lightning F.3/6*	AD	12	Binbrook
11	Lightning F.3/6*	AD	12	Binbrook
23	Phantom FGR.2*	AD	12	Wattisham
29	Phantom FGR.2*	AD	12	Coningsby
56	Phantom FGR.2*	AD	12	Wattisham
111	Phantom FGR.2*	AD	12	Coningsby
43	Phantom FG.1*	AD	12	Leuchars
8	Shackleton AEW.2†	AEW	10	Lossiemouth

* To re-equip with Tornado.

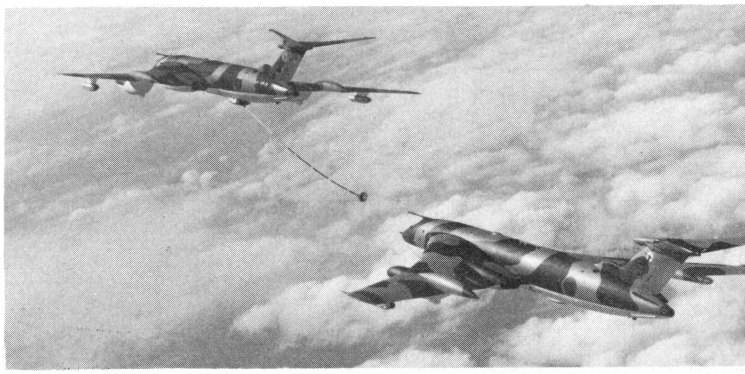
† To re-equip with Nimrod AEW.3 (11 ordered).

A third Lightning Sqn. to be formed with aircraft taken out of store.

R.A.F. Strike Command—No. 18 Group (Available to ACLANT)

Sqn.	*Type*	*Role*	*Estab.*	*Base*
42	Nimrod MR.1*	AS	6	St. Mawgan
120	Nimrod MR.1*	AS	6	Kinloss
201	Nimrod MR.1*	AS	6	Kinloss
206	Nimrod MR.1*	AS	6	Kinloss
22	Wessex HAR.2	SAR	12	Manston, Leuchars, Valley
202	Sea King HAR.3	SAR	16	Coltishall, Lossiemouth, Boulmer, Brawdy

* To be upgraded to MR.2 standard.



Practice refuelling by Handley Page Victor K.2s of the R.A.F.'s two tanker squadrons—No. 55 Sqn. aircraft (nearer) and No. 57

The three Westland helicopters illustrated on this page are (Top to Bottom): *R.A.F. Puma HC.1 of No. 33 Squadron on exercise in Norway; Army Air Corps Gazelle AH.1 of No. 663 Squadron over Belfast; and R.A.F. Wessex HC.2 of No. 72 Squadron from Odiham*

German Army helicopter types include the Aérospatiale (Sud) Alouette II (Left) *and Sikorsky CH-53G (Photos: Aviation Photos International)*

NATO air forces . . . (*page 350*)

GREAT BRITAIN (*continued*)
Royal Navy—Assigned to NATO

Sqn.	*Type*	*Role*	*Estab.*	*Deployment*
814	Sea King HAS.2	AS	4	H.M.S. *Hermes*
819	Sea King HAS.2	AS	5	H.M.S. *Gannet* (Prestwick)
820	Sea King HAS.2	AS	4	H.M.S. *Blake* (until 12/79)
824	Sea King HAS.2	AS	8	Royal Fleet Auxiliaries
826	Sea King HAS.2	AS	4	H.M.S. *Bulwark*
702	Lynx HAS.2	AS	15	Frigates & destroyers
829	Wasp HAS.1	AS	30	Frigates & destroyers
737	Wessex HAS.3	AS	7	"County" class destroyers
845	Wessex HU.5*	C	8	H.M.S. *Hermes*
846	Wessex HU.5*	C	8	H.M.S. *Bulwark*

*To be augmented by Sea King HU.4 (15 ordered).
Nos. 800, 801, 802 Sqns. to equip with Sea Harrier FRS.1 (34 ordered).

GERMANY—Luftwaffe (AAFCE)
2 ATAF

Wing	*Type*	*Role*	*Estab.*	*Base*
AKG 52	RF-4E	PR	30	Leck
JBG 31*	F-104G	GA	36	Noervenich
JBG 33*	F-104G	GA	36	Buchel
JBG 36	F-4F	GA	30	Rheine-Hopstein
LeKG 41†	G.91	GA	30	Husum
LeKG 43†	G.91	GA	30	Oldenburg
JG 71	F-4F	AD	30	Wittmundhaven
LTG 63	C.160	C	36	Hahn

4 ATAF

AKG 51	RF-4E	PR	30	Bremgarten
JBG 32*	F-104G	GA	36	Lechfeld
JBG 34*	F-104G	GA	36	Memmingen
JBG 35	F-4F	GA	30	Pferdsfeld
JG 74	F-4F	AD	30	Neuberg
LTG 61	C.160	C	36	Landsberg
HTG 64	UH-1D	U	100	Ahlhorn

Army operates 200 Alouette II, 120 UH-1, 90 CH-53, 30 BO 105 (total BO 105 order 312 to replace Alouette).
* To re-equip with Tornado (212 on order).
† To re-equip with Alpha Jet (200 on order).

Right: *All the types of helicopter operated by the Royal Navy in recent years—and all Westland-built—are shown in this view* (Top to Bottom): *Sea King HAS.1; Wessex HAS.3; Wessex HU.5; Wessex HAR.1 (now out of service); Lynx HAS.2; Wasp HAS.1; and Gazelle HT.2 (used for training)*

elow: *Still the largest Starfighter user in Europe, the* Luftwaffe *has four Wings of F-104Gs. Illustrated is an aircraft of* JBG 33 *(Photo: J. D. R. Rawlings)*

CANADA—Canadian Armed Forces (1 Canadian Air Group) (AAFCE (4 ATAF))

Sqn.	*Type*	*Role*	*Estab.*	*Base*
421	CF-104G	GA	16	Baden-Soellingen
439	CF-104G	GA	16	Baden-Soellingen
441	CF-104G	GA	16	Baden-Soellingen
444	CH-136 Kiowa	U	10	Lahr

Canada operates the following units in the anti-submarine role:

Sqn.	*Type*	*Role*	*Estab.*	*Base*
404*	CP-107 Argus	AS	6	Greenwood (CP-107 O.C.U.)
405*	CP-107 Argus	AS	6	Greenwood
407*	CP-107 Argus	AS	6	Comox
415*	CP-107 Argus	AS	6	Summerside
423	CH-124 Sea King	AS	12	Shearwater (for vessel deployment)
443	CH-124 Sea King	AS	10	Shearwater
880	CP-121 Tracker	AS	13	Shearwater

* To re-equip with CP-140 Aurora (18 ordered).

Canadian Armed Forces also maintain the following:
3 Squadrons of CF-101
1 Squadron of CF-100, CT-133
2 Squadrons of CF-5A
6 Helicopter Squadrons of CH-118 Iroquois, CH-136 Kiowa, CH-147 Chinook
3 Transport Squadrons of CC-130, CC-137
1 Communications Squadron with Cosmopolitan and Falcon
4 SAR Squadron of CH-113, CC-115, CH-118, CH-135, CC-138

Left: *Canadian A.F. Bell CH-136 Kiowa of No. 444 Squadron, Lahr, Germany.* Right: *Also based at Lahr are two D.H. Canada Dash 7s*

U.S.A.—United States Air Forces Europe (AAFCE (4 ATAF))
3rd Air Force—H.Q. R.A.F. Mildenhall, England

Wing/Unit	*Type*	*Role*	*Estab.*	*Base*	*Squadrons*
10 TRW	RF-4C	PR	30	Alconbury (AR)	1 TRS
20 TFW	F-111E	GA	72	Upper Heyford (UH)	55, 77, 79 TFS
48 TFW	F-111F	GA	96	Lakenheath (LN)	492, 493, 494 495 TFS
81 TFW	A-10A	GA	48	Bentwaters/Woodbridge* (WR)	78, 91, 92, 510 TFS†
10 ACCS	EC-135H	AEW	4	Mildenhall	
306 SW	KC-135‡.	K	20	Mildenhall	Rotated for 60 days from U.S
67 ARRS	HC-130N, HH-53C	SAR	17	Bentwaters/Woodbridge	
513 TAW	C-130E	C	20	Mildenhall	Rotated for 60 days from U.S
527 TFTAS	F-5E	U	20	Alconbury	

* With Forward Operating Locations (FOL) at Sembach, Leipheim, Ahlhorn Noervenich.
† To be followed by 24 aircraft for 509, 511 Sqns. in 1980.
‡ To be supplemented by rotated KC-135 at R.A.F. Fairford (11 SG).
Aircraft fin codes are given in brackets after base names where applicable.

In Iceland as part of the North American Air Defence System (NORAD) is:

57 FIS	F-4E	AD	13	Keflavik

17th Air Force—H.Q. Sembach, Germany

Wing/Unit	*Type*	*Role*	*Estab.*	*Base*	*Squadrons*
26 TRW	RF-4C	PR	36	Zweibrucken (ZR)	17, 38 TRS
50 TFW	F-4D/E	GA	48	Hahn (HR)	10, 496 TFS
86 TFW	F-4E	GA	24	Ramstein (RS)	526 TFS
52 TFW	F-4D	GA	48	Spangdahlem (SP)	5, 23 TFS
52 TFW	F-4G	EW	24	Spangdahlem (SP)	81 TFS
36 TFW	F-15A	AD	72	Bitburg (BT)	22, 53, 525 TFS
32 TFS	F-15A	AD*	18	Soesterberg (CR)	
306 SW	KC-135	K	15	Ramstein	Rotated for 60 days from U.S
435 TAW	C-130E	C	15	Rhein-Main	Rotated for 60 days from U.S
601 TCW	OV-10A	U	30	Sembach	704, 20 TASS
58 MAS	VC-140, T-39, C-12	U	15	Rhein-Main	

* Under control of R. Netherlands A.F.

The following Wings are held in reserve for NATO in the U.S.A.

49 TFW	F-15A	AD	72	Holloman AFB
363 TRW	RF-4C	PR	54	Shaw AFB

United States Air Forces Europe (AIRSOUTH)
16th Air Force—H.Q. Torrejon AB, Spain

Wing/Unit	*Type*	*Role*	*Estab.*	*Base*	*Squadrons*
401 TFW	F-4D	GA	72	Torrejon AB	612, 613, 614 TFS
306SW(det.)	KC-135	K	15	Zaragoza AB	Rotated from U.S.A.

USAFE also maintains a Weapons Training School (406 TFTW) at Zaragoza AB; major communications installations are at R.A.F. Chicksands, England; San Vito, Italy; Hellenikon and Iraklion, Greece; Ankara, Turkey; Hessisch-Oldendorf and Lindsey, W. Germany; Tempelhof, W. Berlin.

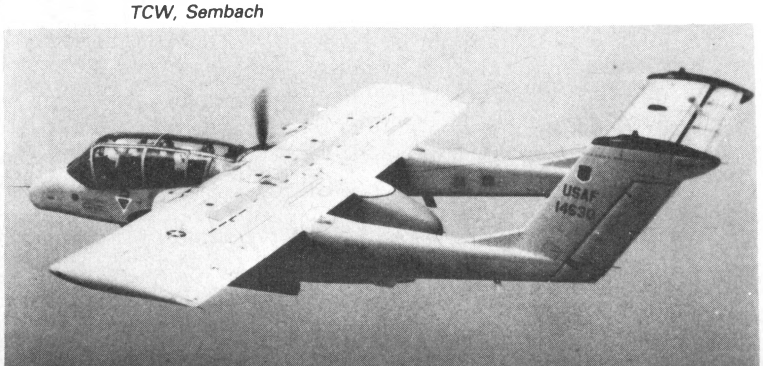
Combat and reconnaissance units are regularly detached to Incirlik, Turkey and Aviano AB, Italy.

First of eighteen Lockheed CP-140 Auroras for the Canadian A.F. with (behind) a Canadair Argus Mk. 1, the type it will replace

Above: *U.S.A.F. Lockheed C-130H Hercules delivers an 18-ton Sheridan tank by LAPES (low-altitude parachute extraction system) to front-line forces during a recent NATO exercise in Germany*

Below: *McDonnell Douglas F-4D Phantom of the U.S.A.F.'s 52nd TFW, Spangdahlem, Germany, laden with bombs and rocket pods*

Rockwell (North American) OV-10A Bronco of the U.S.A.F.'s 601st TCW, Sembach



Left: *Lockheed S-3A Viking of VS-28 landing on "America".* Right: *Grumman F-14A Tomcat of VF-142 (Photos: Brian M. Service)*

NATO air forces . . . *(page 352)*

U.S.A. *(continued)*

United States Navy

The U.S.N. operates P-3B/C AS units from Sigonella, Italy; Keflavik, Iceland; and a split squadron at Rota, Spain and Lajes, Azores. In June 1979 the units deployed (5-month deployments) were VP-45, VP-44 and VP-11 respectively. The U.S. Sixth Fleet (Mediterranean) normally includes two aircraft-carriers. U.S.N. carriers now operate on a mixed-role basis with attack, defence and anti-submarine elements. Typically a carrier embarks:

2 F-14/F-4 Squadrons
2 A-7/A-6 ,,
1 EA-6B ,,
1 S-3A/SH-3 ,,
1 E-2 ,, plus SAR detachments.

In autumn 1978 U.S.S. *Forrestal* had the following units embarked:

VF-11, VF-74 with F-4J — VAQ-130 with EA-6B
VA-85 with A-6E/KA-6D — VS-30 with S-3A
VA-81 with A-7E — VAW-116 with E-2B
VMA-231 with AV-8A, plus helicopter detachments.

The U.S. Second Fleet (Atlantic) deploys four carriers.

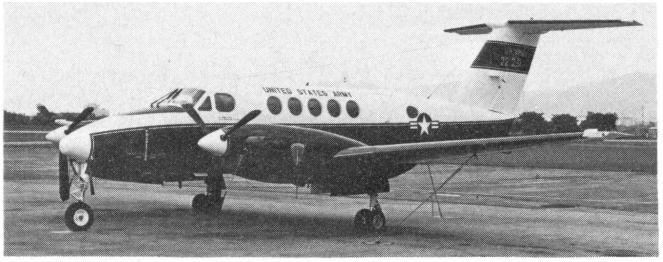
United States Army

The U.S. Army maintains an unspecified number of aircraft, mainly helicopters, in Europe. The total probably exceeds 600. Types operational include AH-1S, UH-1H, CH-47C, OH-58A and U-21G, C-12.

Above: *Bell AH-1G HueyCobra of the U.S. Army's 334th Tactical Helicopter Company (Photo: J. D. R. Rawlings)*

Below, Left: *Aeritalia-built F-104S Starfighters of the Italian A.F.'s 21° Gruppo, 53° Stormo (Photo: Aviation Photos International)*

Below, Right: *Fiat G.91Y of the Italian A.F.'s 101° Gruppo, 8° Stormo, from Cervia San Giorgio*



Beechcraft C-12A of the U.S. Army (Photo: Aviation Photos International)

ITALY—Aeronautica Militare Italiana (AIRSOUTH (5 ATAF))

Sqn.	*Type*	*Role*	*Estab.*	*Base*	
18*	RF-104G	PR	12	Verona-Villafranca	3 Aerobrigata
28*	RF-104G	PR	12	Verona-Villafranca	Ricognitori
132*	RF-104G	PR	12	Verona-Villafranca	Tattici
154*	F-104G	GA	12	Ghedi	6 Wing
101	G.91Y	GA	18	Cervia San Giorgio	8 Wing
14	G.91R	GA	18	Treviso	2 Wing
103	G.91R	GA	18	Treviso	
313	G.91PAN	GA	18	Rivolto	
13	G.91R	GA	18	Brindisi	
23	F-104S	GA	12	Rimini-Miramare	5 Wing
102	F-104S	GA	12	Rimini-Miramare	
12	F-104S	GA	12	Gioia del Colle	36 Wing
156	F-104S	GA	12	Gioia del Colle	
22	F-104S	GA	12	Istrana	51 Wing
155	F-104S	GA	12	Istrana	
71	EC-47, EC-119, EC-130,PD.808	EW	12	Pratica di Mare	14 Wing
9	F-104S	AD	12	Grossetto	4 Wing
10	F-104S	AD	12	Grazzzanise	9 Wing
21	F-104S	AD	12	Cameri	53 Wing
86	Atlantic	AS	8	Cagliari-Elmas	30 Wing
87	S-2F	AS	8	Fontanarossa	41 Wing
88	Atlantic	AS	8	Sigonella	
84	HU-16	SAR	12	Rome-Ciampino	
85	HH-3F, AB.204	SAR	20	Rome-Ciampino	
2	G-222	C	20	Pisa-San Giusto	46 Aerobrigata
50	C-130H	C	20	Pisa-San Giusto	
98	G.222	C	12	Pisa-San Giusto	
92	AS.61	U	2	Pratica di Mare	
93	AB.47	U	60	Pratica di Mare	31 Wing
94	AB.204	U	40	Pratica di Mare	
306	PD.808, DC-9, P.166M	U	20	Pratica di Mare	

* To re-equip with Tornado (100 ordered).

Italian Navy operates 24 SH-3D, 28 AB.212, 30 AB.204.

Italian Army operates 26 CH-47, 150 AB.206, 138 AB.205, 20 AB.204, 5 A.109.

Above: *An Italian Army Boeing-Vertol CH-47C Chinook, built under licence by Elicotteri Meridionali (Photo: Aviation Photos International)*

Below: *Italian Army Agusta A.109AT anti-tank helicopter with missile-launchers alongside fuselage (Photo: Aviation Photos International)*

Below, Right: *Agusta-Bell AB.212ASW anti-submarine helicopter of the Italian Navy (Photo: R. Tamburini via Aviation Photos International)*

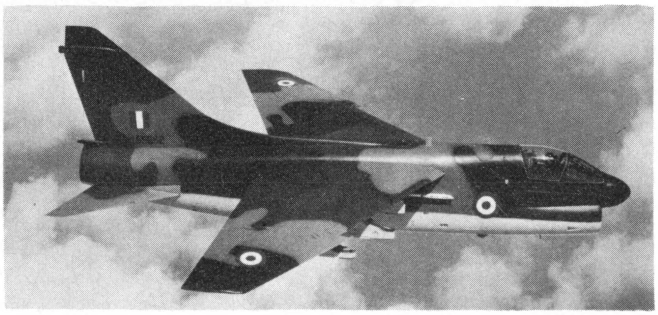
Above: *ECM version of the Italian A.F.'s Aeritalia G.222 transport*

GREECE—Elliniki Aeroporia (AIRSOUTH (6 ATAF))

Sqn.	*Type*	*Role*	*Estab.*	*Base*	
348	RF-4E	PR	12	Larissa	110 Wing
349	RF-5A	PR	12	Larissa	
345	A-7H	GA	18	Larissa	
338	A-7H	GA	18	Soudha Bay	115 Wing
340	A-7H	GA	18	Soudha Bay	
339	F-4E	GA	18	Andiavidha	117 Wing
344	F-4E	GA	18	Andiavidha	
335*	F-104G	GA	18	Araxos	116 Wing
336	Mirage F 1C	AD	18	Tanagra	114 Wing
342	Mirage F 1C	AD	18	Tanagra	
337	F-5A/B	AD	15	Nea Ankhialos	111 Wing
341	F-5A/B	AD	15	Nea Ankhialos	
343	F-5A/B	AD	15	Nea Ankhialos	
362	AB.205	SAR	12	Eleusis	
363	HU-16	SAR	8	Eleusis	
355	C-130H	C	11	Eleusis	
356	Noratlas, C-47, CL-215	C	40	Eleusis	
357	UH-1	U	10	Eleusis	
359	H-19	U	10	Eleusis	

* To re-equip with F-4E (20 ordered).
Greek Navy operates 5 Alouette III.
Greek Army operates 25 UH-1, 40 AB.204/205, 24 L-21.

Below: *Vought A-7H Corsair II of the Hellenic A.F.*



TURKEY—Turk Hava Kuvvetleri (AIRSOUTH (6 ATAF))

Unlike other NATO air forces that of Turkey operates a series of multi-role wings with squadrons (*filo*) of various types operating from the same base. These bases fall within the administration of 1 and 3 Air Forces in the west and east of the country respectively. For the sake of clarity units are shown by wings, regardless of role.

Sqn.	*Type*	*Role*	*Estab.*	*Base*
1 Air Force				
111	F-100C/F	GA	16	Eskisehir
112	RF-5A	PR	18	Eskisehir
113	F-4E	GA	18	Eskisehir
131	F-4E	GA	18	Konya
132	F-100C/F	GA	16	Konya
141*	F-104G	GA	16	Murted
142	F-104S	AD	16	Murted
161	F-5A	GA	20	Bandirma
162	F-100C/F	GA	16	Bandirma
191*	F-104G	GA	16	Balikesir
192	F-5A	GA	20	Balikesir
3 Air Force				
151	F-5A	GA	20	Merzifon
152	F-5A	GA	20	Merzifon
171	F-100C/F	GA	16	Erhac
172	F-100C/F	GA	16	Erhac
181	F-5A	GA	20	Diyarbakir
182	F-104S	AD	16	Diyarbakir
183	RF-5A	PR	18	Diyarbakir
221	C.160	C	20	Erkilet (Kayseri)
222	C-130E	C	7	Erkilet
231	C-47	C	14	Etimesgut
232	C-54, Viscount, Islander	U	14	Etimesgut
?	AB.206	SAR	18	dispersed

* To re-equip with F-4E and RF-4E (32 and 8 on order).
Turkish Navy operates 12 S-2A/E, 15 AB.212.
Turkish Army operates 150 AB.204/205, 15 AB.206, 20 H-13, 9 Do 28 18 U-3.

Below, Left: *Transall C-160 transport of the Turkish A.F.* Right: *Turkish A.F. F-104S Starfighters at Murted (Photos: Aviation Photos International)*

Portuguese A.F. Fiat G.91R (Left) *and CASA C.212 Aviocar seen at Cambrai, France, in June this year (Photos: Aviation Photos International)*

NATO air forces . . . *(page 354)*

PORTUGAL—Forca Aerea Portuguesa

Following the Portuguese withdrawal from Africa after lengthy colonial wars the Portuguese Air Force is in a weak state. Squadron numbers are believed not to be used and the Air Force strength is as described.

Type	*Role*	*Estab.*	*Base*
G.91R-3/4	GA	18	Montijo
F-86F	AD	18	Monte Real
C-130H	C	5	Tancos
C.212	C	12	Tancos
C.212	C	6	Lajes
Do 27	U	15	Tancos
Alouette III	U	26	Montijo
Puma	U	6	Montijo
Puma	U	4	Lajes

FRANCE—Armée de l'Air

The French Air Force is not integrated within NATO although units exercise regularly with NATO forces. Present strength of the Air Force is summarised as follows:

Air Defence	—	120 Mirage F 1C	(8 Squadrons)
Tactical Air Force	—	120 Mirage IIIE	(8 Squadrons)
		30 Mirage 5F	(2 Squadrons)
		120 Jaguar	(8 Squadrons)
		45 Mirage IIIR	(3 Squadrons)
Strike	—	30 Mirage IVA	(6 Squadrons)
		11 KC-135F tankers	(3 Squadrons)
Transport, etc.	—	42 C.160	(3 Squadrons)
		65 Noratlas	(4 Squadrons)
		5 DC-8	(1 Squadron)
		32 miscellaneous	(1 Squadron)
		120 Alouette }	(6 Squadrons)
		20 Puma }	

French Naval Air Arm (*Aéronavale*)

Attack	—	12 Etendard IVM	(1 Squadron)
		12 Super Etendard	(1 Squadron)
Air defence	—	20 F-8E Crusader	(2 Squadrons)
Anti-submarine	—	24 Alizé	(2 Squadrons)
		25 Atlantic	(3 Squadrons)
		10 SP-2H	(1 Squadron)
PR	—	8 Etendard IVF	(1 Squadron)
ASW	—	36 Helicopters	(3 Squadrons)

Plus various communications units.

Note: Most of the above aircraft, excluding the Atlantics and SP-2H Neptunes, are embarked in aircraft-carriers or, in the case of helicopters, in frigates and other warships of the French Navy.

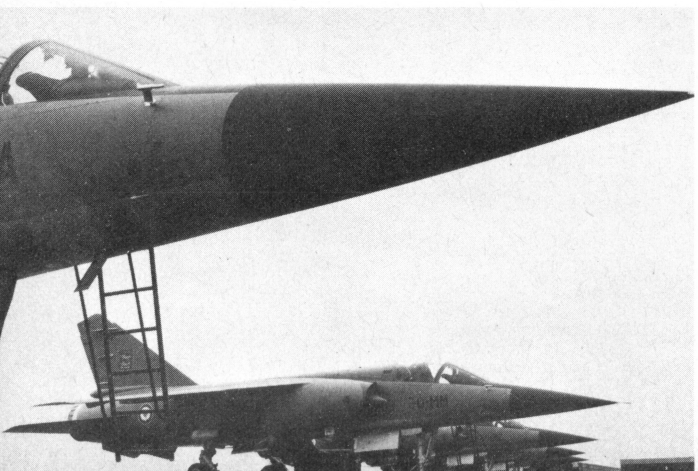
Army Aviation (*A.L.A.T.*)

The French Army operates 165 Gazelle, 155 Alouette II, 65 Alouette III, 130 Puma and about 200 fixed-wing aircraft in Metropolitan France.

* * *

Acknowledgments.—The author would like to thank George Krasker and Al Owens for their advice and help in the preparation of this article. Considerable assistance has also been given by representatives of most of the European air arms and of course the U.S. Air Force. Finally, the author's thanks are due to the crew of the P-3B of VP-11 at Greenham Common who filled in the last gaps.

Below, Top: *French A.F. Jaguar of* EC 1/7 *"Provence" from St. Dizier about to take off from R.A.F. Bruggen with a resident No. 14 Jaguar (nearer) during an exchange visit by the French* Escadron
Bottom Left: *Dassault Mirage F 1C fighters of the French A.F.'s* EC 2/30 *"Normandie-Niemen", based at Rheims*
Bottom Right: *Vought F-8E(FN) Crusader fighters of the French Navy*



Airlines of the World

by GÜNTER G. ENDRES

TAAG—Angola Airlines Boeing 707 D2-TAG at Vienna Airport (Photo: Prof. Johannes Zopp)

TAG – LINHAS AEREAS DE ANGOLA
ANGOLA AIRLINES

TAAG-Angola Airlines (Linhas Aereas de Angola)
(Flight Code DT)

TAAG-Angola Airlines, until 1st October 1973 a division of the Administration of Railways, Harbours and Air Transport, was founded on 8th September 1938 as Direcçao de Exploraçao dos Transportes Aéreos, more generally known as DTA. The new airline inaugurated scheduled services with three de Havilland Dragon Rapides between Luanda and Nova Lisboa, as well as between Luanda and Pointe Noire, Congo (then French Equatorial Africa), where connections were available to Europe.

International and regional routes now link Luanda with Lisbon, Havana, Maputo, Brazzaville, Kinshasa, Nairobi and Addis Ababa with an interesting fleet of American, European and Russian-built aircraft. A comprehensive domestic network serves many important towns, such as Cabinda, Uige, Benguela, Malange and Saurimo. The airline also provides regular services to the islands of São Tomé and Sal off Africa's west coast.

The present title of the airline was adopted in 1975 following the country's independence from Portugal.
Head Office: Rua Luis de Camoes, 123, C.P.79, Luanda, Angola. Telephone: 32990/92/93.

Reg'n.	*Type*	*c/n.*	*Previous Identity*
D2-TAA	Boeing 737-2M2C	21172	
D2-TAB	Boeing 737-2M2C	21173	
D2-TAC	Boeing 707-349C	18975	G-BDCN
D2-TAD	Boeing 707-349C	19355	G-AWWD
D2-TAE	Fokker F.27-600 Friendship	10423	PH-FOX
D2-TAF	Fokker F.27-600 Friendship	10424	PH-FTG
D2-TAG	Boeing 707-373C	18583	HZ-ACF
D2-TAH	Boeing 737-2M2C	21723	
D2-TEO	Fokker F.27-200 Friendship	10207	CR-LEO
D2-TIJ	Fokker F.27-200 Friendship	10326	CR-LIJ
D2-TMB	Fokker F.27-600 Friendship	10457	CR-LMB
D2-TYA	Yakovlev Yak-40FG	9721553	
D2-TYB	Yakovlev Yak-40FG	9721653	
D2-TYC	Yakovlev Yak-40FG	9721753	
D2-TYD	Yakovlev Yak-40FG	9721853	

TRANS ADRIA

Trans Adria—Aerotransportna Radna Organizacija
(Flight code JH)

Trans Adria was established on 27th December 1978 to take over the operations of Pan Adria Airways. Scheduled passenger and cargo services are flown with Fairchild-Hiller FH-227Bs and newly acquired Swearingen Metros over a comprehensive domestic network and externally to Tirana (Albania), Vienna, Klagenfurt and Linz (Austria), and to Bari, Bologna and Venice (Italy). Internal destinations are Zagreb, Skopje, Titograd, Pula, Rijeka, Split, Dubrovnik, Mostar, Belgrade, Maribor and Ljubljana.

The airline's other extensive activities comprise agricultural aviation, night postal services, air-taxi flights, passenger and cargo charter work and aircraft maintenance.
Head Office: 41150 Zagreb-Airport, Yugoslavia. Telephone: (041) 526-904. Telex: 21617.

Reg'n.	*Type*	*c/n.*	*Previous Identity*
YU-ALA	Fairchild-Hiller FH-227B	525	N7809M
YU-ALC	Fairchild-Hiller FH-227B	532	N7812M
YU-ALD	Fairchild-Hiller FH-227B	533	N7813M
YU-ALF	Swearingen SA226AT Merlin IV	AT-062	
YU-ALG	Swearingen SA226AT Merlin IV	AT-066	
YU-ALH	Swearingen SA226TC Metro II	TC-279	
YU-ALI	Swearingen SA226TC Metro II	TC-285	
YU-ALJ	Swearingen SA226TC Metro II	TC-288	
YU-BBC	Piper PA-25 Pawnee 235	25-2437	N6830Z
YU-BBV	Piper PA-25 Pawnee 235	25-2896	N7111Z
YU-BCO	Aero Commander 500B	1635-1	N6500V
YU-BCR	Aero Commander 500B	1645-6	
YU-BDB	Piper PA-25 Pawnee 235	25-3178	N72722
YU-BGA	Aero Commander 500B	1874-47	
YU-BGP	Piper PA-25 Pawnee 260	25-5051	N8621L
YU-BGR	Piper PA-25 Pawnee 235	25-2206	N6624Z
YU-BIP	Piper PA-25 Pawnee 235	25-7305524	N6765L
YU-BIR	Piper PA-25 Pawnee 235	25-7305525	
YU-BIS	Piper PA-25 Pawnee 235	25-7305526	
YU-BIU	Piper PA-25 Pawnee 235	25-7305547	
YU-BKH	Piper PA-25 Pawnee 235	25-2403	
YU-BLF	Piper PA-25 Pawnee 235	25-7305527	
YU-BLO	Piper PA-36	36-7860074	
YU-BLR	Piper PA-36	36-7860086	
YU-BLS	Piper PA-36	36-7860087	
YU-BLT	Piper PA-36	36-7860088	
YU-BLU	Piper PA-31T Cheyenne	31T-7820090	

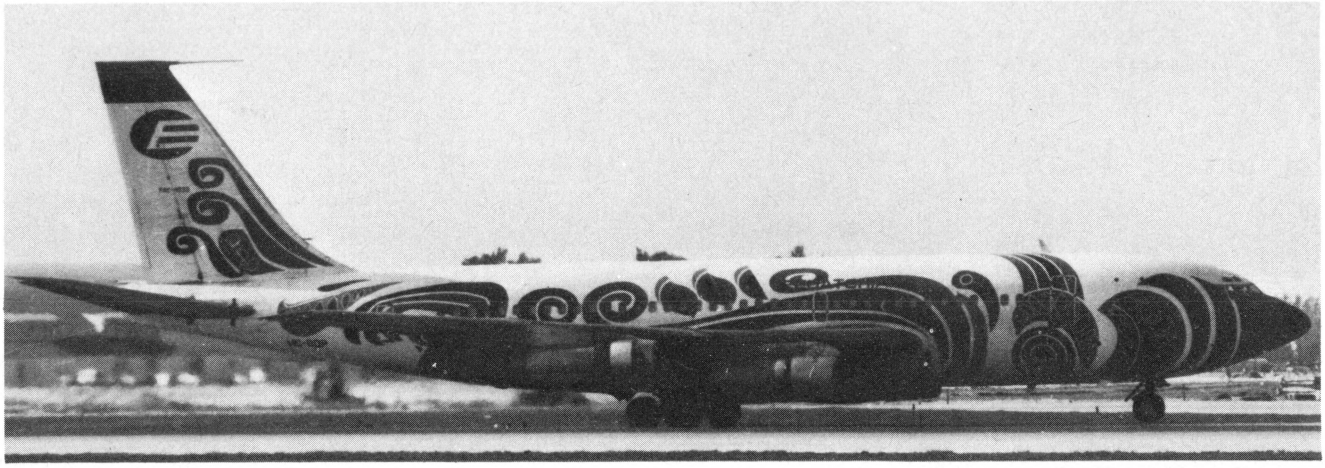
LAPA

LAPA-Lineas Aereas Privadas Argentinas S.A.

LAPA is one of several small airlines in Argentina licensed in recent years to provide local services. With a fleet of three Swearingen Metro commuter aircraft, the company was given permission on 24th May 1978 to provide passenger and cargo charter flights exclusively to destinations in North, Central and South America. Authority for scheduled third-level services was granted on 16th March 1979, and these now serve La Plata, San Nicolas, Necochea, Tres Arroyos, Pehuajo and Olavarria, all in the province of Buenos Aires, as well as Parana, Concordia and Gualeguaychu in the province of Entre Rios. Passengers, cargo and mail are carried on all flights.
Head Office: Calle Lavalle 465-3er. piso, C.P.1047, Buenos Aires, Argentina. Telephone: 32-0629, 32-0489, 31-6906. Telex: 121628.

Reg'n.	*Type*	*c/n.*
LV-MDD	Swearingen SA226TC Metro II	TC-238
LV-MGE	Swearingen SA226TC Metro II	TC-249
LV-MGF	Swearingen SA226TC Metro II	TC-253

Left: *LAPA Swearingen Metro II LV-MGF at Buenos Aires—Ezeiza (Photo: N. Oertel).* Right: *Another Metro II operator is Trans Adria*



Ecuatoriana's Boeing 720-023B HC-BDP, c/n. 18033, presents a dazzling sight at Miami International; also carries military serial FAE 18033

Miami Miscellany

Story and photos by ROGER KUNERT

THE AVIATION enthusiast in the U.K. might be forgiven for thinking that the piston-engined aircraft era is over. There is but a handful of Carvairs, DC-3s and DC-6s registered in England with very few in Europe that visit this country. Karair's DC-6 still manages a daily freight flight from Finland to London's Heathrow and occasionally a Convair 440 from Scandinavia or a DC-6 from France will make an appearance.

In the U.S.A. things are different! There aircraft like the Douglas DC-6, Convair 440, Curtiss C-46 and even the Lockheed Constellation still take to the air regularly. Out of several parts of America where such types can be found the Miami area is one of the most interesting. Miami has everything from piston and jet airliners to executive jets and light aircraft—all registered either in the U.S.A. or Central and South America.

There are basically four airfields to visit: Miami International, Opa Locka, Fort Lauderdale Executive and Fort Lauderdale Hollywood. It is perhaps best to start with Miami International as that is the airfield of arrival if flying direct from London.

The first impression is of the sheer numbers of DC-3s, DC-6s, C-46s and Convairs on the airfield. Also very noticeable are the numerous South American airlines that use Miami, such as LANICA of Nicaragua, LAB of Bolivia, TAN of Honduras, Dominicana and Aero Peru, the list is endless.

Miami International has three main runways: 27R/9L, 27L/9R, and 30/12. Between the north side of 9L and North West 36th Street, which runs parallel to it, are the various maintenance areas. The companies that operate from this part of the airfield have their own aprons and it is not unusual to see a DC-7 next to Mystère 20 (Falcon 20 in U.S. vernacular) or a PA-28 Cherokee!

Industrial espionage

The executive jet park is also in this part of the airfield and is operated by Aero Facilities who are very reluctant to let anyone photograph the aircraft without the owner's permission. Even then, the aircraft doors must be shut and no one must be standing near the aeroplane. This is generally true in North America as there is a great deal of industrial espionage between the companies that operate these sorts of aircraft. Also, as sometimes happens, a company might be using an aircraft without the knowledge of the shareholders.

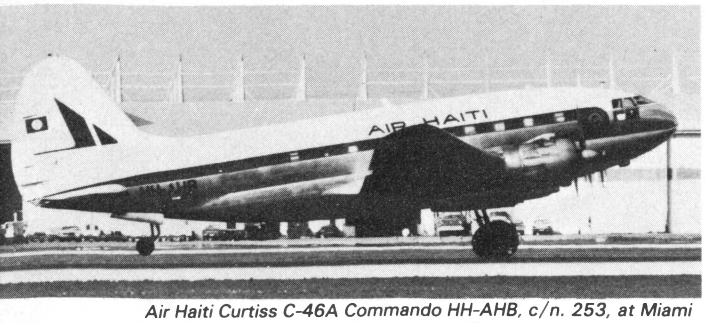
Fortunately, this does not apply to the operators of "real" aeroplanes as they seem only too keen for photographs to be taken. Next to Aero Facilities are Bellomy Lawson Inc. whose main interest is to maintain the Douglas DC-6. Apart from ex-U.S.A.F. C-118s (military variants of the DC-6) they have also bought ex-U.S.A.F. Convair C-131s and these will be converted for civil use as soon as time can be found. They lease many of their DC-6s to such countries as Surinam and Guyana.

Rich International are another such company who use C-46s and DC-6s. One DC-6A is at present leased to the Cayman Islands but at the same time retaining its American registration—N61267. C-46s are also operated by Air Haiti, two of which, HH-222 and HH-221, have just been re-registered HH-AHA and HH-AHB respectively. Other C-46 users are Bahamasair (N355M) and Onyx (N9890Z). Incidentally, N9890Z used to fly into London in the early 1960s while on lease to Lufthansa.

Miami is a great storage area, not only for the piston-engined aircraft, but also for jet airliners. LANICA used to operate Convair 880s until a year ago and their four are stored next to the

Republic RC-3 Seabee N6575K at Fort Lauderdale Executive Airport

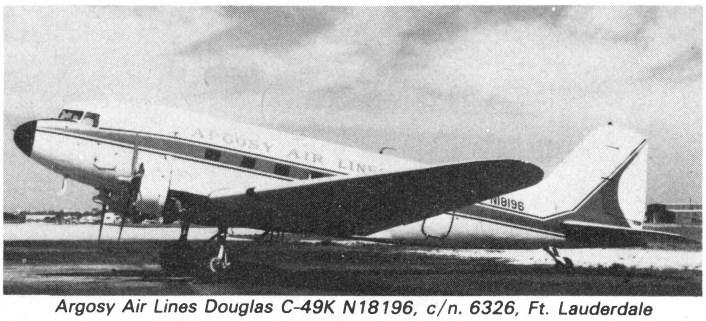
A Panamanian-registered Cessna 421B, HP-686, visiting Opa Locka



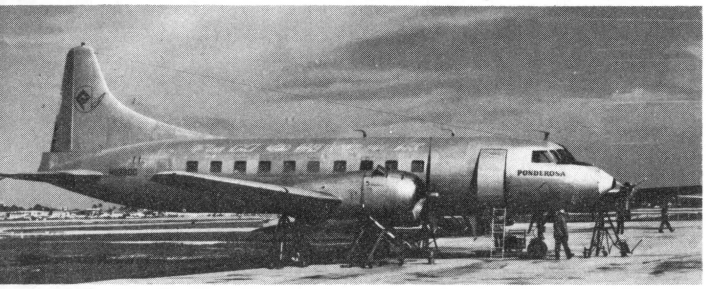
Air Haiti Curtiss C-46A Commando HH-AHB, c/n. 253, at Miami

Lockheed L.1049 Constellation N6207C, c/n. 4007, at Fort Lauderdale

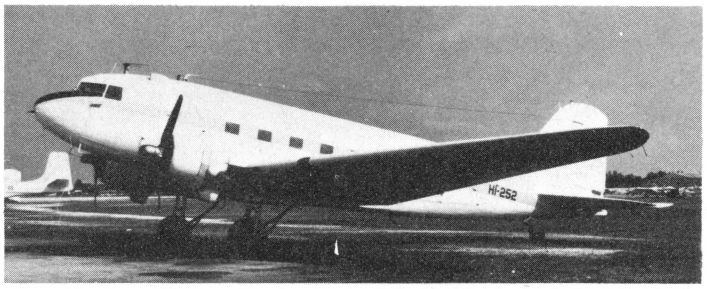
Martin 4-0-4 N257S, c/n. 14110, with Air South titles, Miami



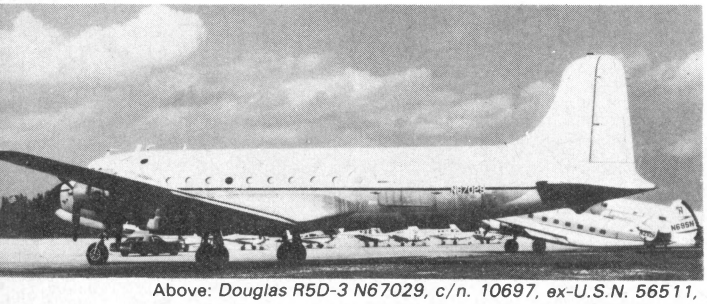
Argosy Air Lines Douglas C-49K N18196, c/n. 6326, Ft. Lauderdale



Convair 240 N8330C "Ponderosa", c/n. 109, at Fort Lauderdale

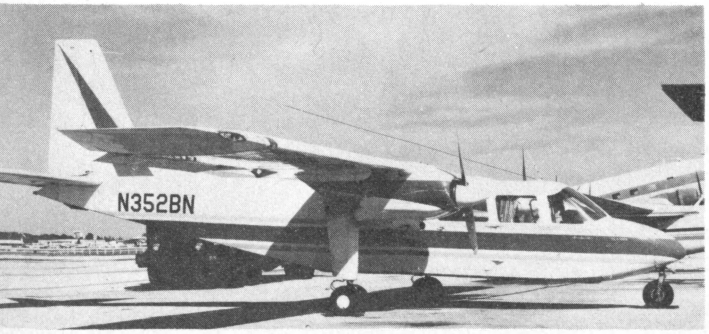


Aerolineas Dominicanas Douglas C-47DL HI-252, c/n. 4498, at Opa



Douglas DC-7CF N8219H, c/n. 45214, ex SE-CCE, at Opa Locka

Above: *Douglas R5D-3 N67029, c/n. 10697, ex-U.S.N. 56511, Opa Locka.* Below Left: *Britten-Norman Islander N352BN, c/n. 352, ex G-BBJC, Ft. Lauderdale.* Below Right: *Chalk's International Grumman G-73 Mallard N3010, c/n. J-43, at Watson Island/Miami*



Cessna 207 Stationair YV-1671P, one of many Venezuelan visitors seen at Opa Locka

Miami miscellany . . .

Rich terminal. Many of the passenger CV-880s are now being converted for freight operations and several are at Miami, including N880JT which caused some fuss at Gatwick last year when it was impounded for non-payment of fees, and N880EP which was owned by the late Elvis Presley.

Similarly, McDonnell Douglas DC-8s are also in storage here; one of which is N53KM, better remembered in the U.K. as 4R-ACQ of Air Ceylon. Like the CV-880, many DC-8s are having cargo doors fitted and several ex-United Airlines aircraft are in use with such companies as Zantop, International Express and Jet Freight Cargo.

An Ansett Boeing 727 is not the sort of aircraft one would expect to see at Miami, but VH-RME is being refurbished for re-sale. Among the National Boeing 727s and Eastern DC-9s at the time of my visit was an Aer Lingus Boeing 737, EI-ASH; leased by Air Florida as N80AF, it was still in its Irish green livery but with Air Florida titles.

Eight miles due north of Miami International is the executive airfield called Opa Locka. Apart from numerous Cessnas and Pipers of different models, there are several interesting aircraft, the largest being a DC-7C, N8219H, which is still in flying condition. Also on the airfield is another DC-7C, N90744, or rather its fuselage which is used by Dade County for fire practice; under the faded paintwork on its roof can be seen "BOAC", as this particular machine was operated back in the 1950s as G-AOIH.

Of the other piston airliners at Opa Locka there are two from South America. C-46 CC-CDC, still with faded LASA (Linea Aerea Sud Americana) titles, rests in the centre of the airfield next to DC-3 HI-252 which is in much better condition. In the same area is Martin 4-0-4 N35JS in an immaculate red, yellow and white colour scheme with Global titles. There are also two Douglas A-26 Invaders: N600WB, a model A-26C painted like many other executive aeroplanes; and N550 (A-26B), which has been restored to U.S.A.F. colours. Other aircraft not seen too often in Europe include the Grumman family of amphibians—G-73 Mallard, G-44 Widgeon and G-21 Goose. There are hosts of Beechcraft 18s of the many models and several of the larger Lockheed 18s.

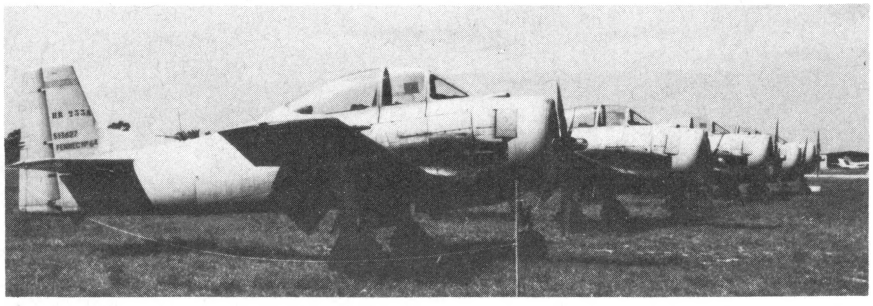
Many Central and South American light aircraft are semi-resident at Opa Locka, those from Venezuela being the most numerous. Other countries included Canada, Honduras, the Dominican Republic, Panama, Argentina, Costa Rica and El Salvador.

Of the many U.S.-registered light aircraft on the field is a D.H. Canada D.H.C.-1 Chipmunk in R.A.F. colours. Registered N6WG (c/n. C1/0239), it is in a very bad condition and it will take a lot of work to get this particular machine airwothy. "Whiskey Golf" was once on the British register as G-BBTO and before that with the R.A.F. as WD229. Another ex-British aircraft on the field is de Havilland Heron G-AODY, being overhauled for the Puerto Rican airline Prinair as N576PR.

Fort Lauderdale

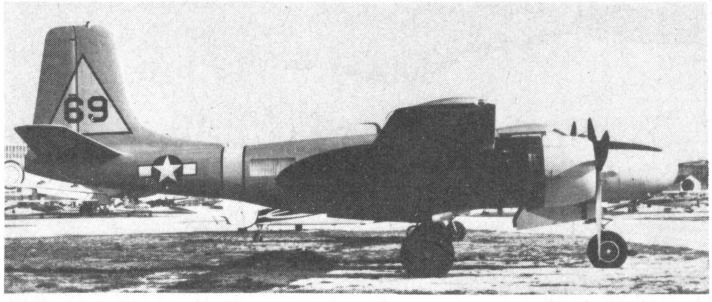
Moving further north on Highway 95 is fort Lauderdale. Two airports serve this "suburb" of Miami, the Executive airfield and Hollywood International. At the former are another three hundred or so American-registered light aircraft, plus the following "gems": another ex-R.A.F. Chipmunk, WZ873 (alias G-BBNE), and Prentice G-AOLP. (The Prentice was a true friend as I had flown in this particular machine when it was based at Plymouth Roborough back in the early 1960s!) Still more Venezuelan Cessnas are here, together with aircraft from Brazil, Jamaica and Colombia.

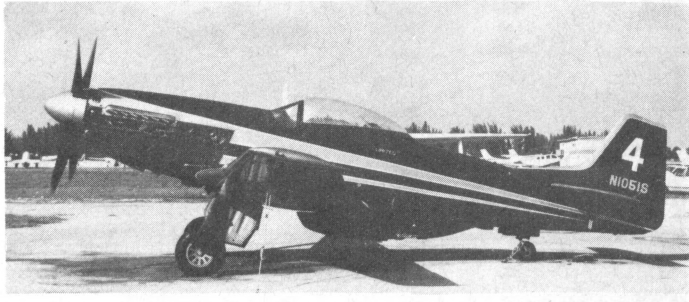
Impounded in a far corner of the Executive airfield are five North American T-28s on delivery from Morocco to Honduras. The sixth one is impounded at Lakehurst, N.J., but all will be delivered when financial difficulties have been ironed out. Out of the two DC-3s on the field, N427W has been impounded for alleged drug smuggling and the other one, N18196, is part of the rapidly decreasing fleet of Argosy Air Lines. Its sister ship N407D was lost on 21st September last year while making a flight between Fort Lauderdale and Havana, Cuba. Before that a Convair 440, N9302, on a one-engine ferry flight from Columbus to Fort Lauderdale was written off into the Ohio

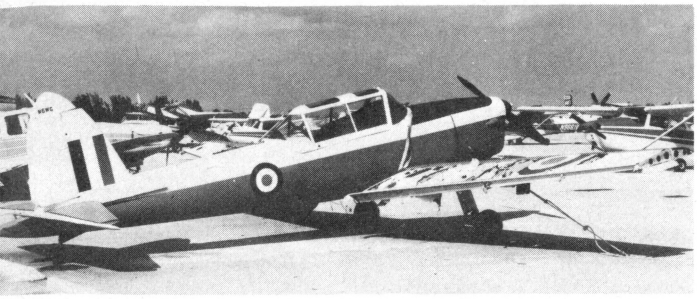


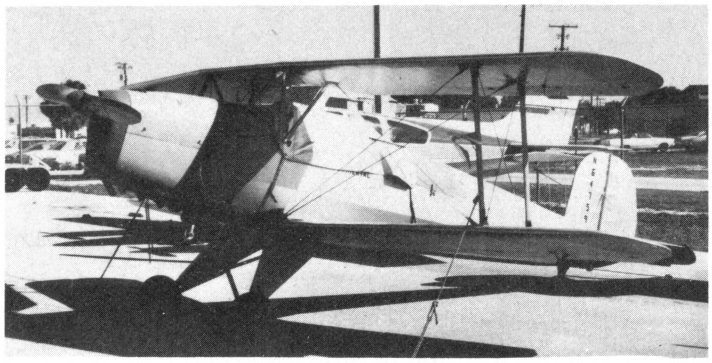
Left: *Sud Fennecs (ex-French North American T-28s) destined for the Honduran A.F. but delayed at Ft. Lauderdale Exec.—HR-233A in front*

Below Left: *Douglas A-26B Invader N550, c/n. 27834, ex N5BP; and* (Right) *North American P-51D Mustang, N1051S, c/n. 48124, ex 45-11371, at Opa Locka*









Top Left: *D.H. Canada Chipmunk N6WG, c/n. C1/0239, ex G-BBTO and WD229, at Opa Locka.* Right: *Bücker Bü 131 Jungmann N64759, Ft. Lauderdale.* Bottom Left: *Percival Prentice G-AOLP at Ft. L'dale. Exec.* Right: *Beagle 206 N85JH, c/n. B-053, ex G-AVCI, at Ft. L'dale*

River near Skippingport, P.A., on 12th May 1978.

It is worth noting that out of the five airworthy Bell P-63 Kingcobras in the States, one is here. N6763 is painted in a very high gloss green colour scheme with Russian-type stars and shares a hangar with three North American P-51D Mustangs.

Fort Lauderdale Hollywood International, to give it its full name, is nearby and it takes about ten minutes to drive between the two—traffic on the Freeway permitting! Again, the first impression is the same as at Miami—the vast number of piston-engined airliners on the airfield.

This is the home base of Mackey Airlines with their fleet of DC-6s and CV-440s. However, they have just declared bankruptcy and their operations are in the process of being taken over by a company known as Charter Air. In the corner of the airfield where Mackey operate are several Convairs and DC-6s in various states of disrepair. Some of the DC-6s still carry United Airlines titles as they were brought for spares by Mackey and never flown. Also in this area are several DC-3s and an ex-U.S.A.F. C-118A, XA-GOA with TASCA (Transporte Aereo de Carga S.A.) titles.

On the other side of the single runway is a pair of what was probably the world's best-loved piston airliner, the Lockheed L.1049 Constellation. N6207C with its faded Eastern Airlines paint work still manages to look majestic. The other "Connie", N6206C, is being refurbished and will be available for sale, even though it has not flown for several years.

With an airfield that has fifteen DC-6s, twenty DC-3s and seventeen Convairs (240, 340 and 440), not to mention the odd C-46, DC-4, B-25 and Catalina, it is very difficult to find words that will do it justice!

South Florida Aircraft are a company that likes one particular aircraft type—the Beagle 206. Mr. James A. Hill, the President, will not have a bad word said against them; in fact, he has just bought two ex-Australian examples that recently passed through Biggin Hill. He would have had three, except for the fact that one was written off en route. Many of the "old faces" are here under a different guise: for example, G-ATKO is now N6862, G-AVCI is N58JH, G-ATZP is N8010, and G-AVLK is truly magnificent in an overall black colour scheme with registration N15JP painted in red. Finally, the ex-R.A.F. Basset XS772, which became G-BCJB for onward sale, is here as N90810.

While on the subject of British-built aircraft, the Britten-Norman Islander is also very popular in the U.S.A. Two are here using the construction number for a registration: N154BN, c/n 154 (ex-TI-AIW) and N352BN, c/n 352. The latter started life as G-BBJC, being sold as N24JA, then to Canada as C-GCXB and finally to its present status.

Before leaving this fascinating area of the world, a mention must be made of Chalk's International Airline. They operate five Grumman G-73 Mallards from Watson Island, near Miami Beach, to Nassau, Bimini and Cat Cay. Chalk's are supposed to be the oldest airline in the world (founded in 1919) and their red and white amphibians are very popular with tourists and are nearly always full.

This article has only scratched the surface of the Miami area, but if anyone who is interested in old or unusual aeroplanes has a chance to visit Florida, then a trip to Miami and Fort Lauderdale has to be top priority.

Bell P-63E Kingcobra N6763, in mock Russian markings, sharing a hangar with some Mustangs at Fort Lauderdale Executive. It is one of five airworthy Kingcobras in the U.S.A.

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Russia looks East

by Air Commodore G. J. C. Paul, C.B., D.F.C., F.R.Ae.S.

DURING THE closing months of last year the Chinese invaded northern Vietnam, and having advanced to positions whence they might have entered the northern plains and threatened Hanoi itself, withdrew. As, indeed, they said all along that they would.

More significant than this actual conflict, perhaps, was Russia's reaction to it. Hitherto the Russians had always backed the Hanoi Government, from the first days of Ho Chi Minh, right up to the final withdrawal of the U.S.A. from Vietnam. Russian arms—in particular, anti-aircraft missiles—played a decisive part in the final outcome. The Chinese, on the other hand, having been initially only lukewarm supporters, ended up being more obstructive than helpful; so that Russian arms supplies routed via China were frequently delayed, and sometimes never arrived at all, compelling the Russians to depend increasingly upon sea and air transport.

The Hanoi Government might have expected similar support this time; but instead Russia seems to have been content with warnings and threats, to deter anyone from helping the Chinese. Very little Russian action was apparent, except significantly the movement of some warships south from Vladivostok, through the Sea of Japan, and into the South China Sea. In addition, the Soviet Navy's newest aircraft-carrier, *Minsk,* a ship comparable in size to our recently retired *Ark Royal,* emerged from the Black Sea, and joined other ships of the Russian Fleet in the Mediterranean. But nothing was done either to weaken or to alter the posture of forces facing NATO in the West.

It might quite simply be that the Russians considered themselves to be fully prepared to meet any eventuality, thus making new moves to meet this situation unnecessary. But suppose not? And certainly Russia's Vietnamese friends might have been forgiven for being a little disappointed at the lack of visible support which they received.

To look more closely at this proposition, it is interesting to study the map—not a Mercator projection, which exaggerates the northern and southern hemispheres—but at the globe. Here it is easily seen that well over half of Siberia lies further north than Greenland, and that much of it is within the Arctic Circle. A January temperature chart shows that most of it, at that time, stays below -10°C. and that in the Arctic Circle the temperature can fall below -50°C. In large parts of Russia's Asian Empire the ground never thaws out; much of it is tundra or desert, and the remainder fir forests. Only a thin strip, close along the borders of Sinkiang, Mongolia and Manchuria, can be regarded as marginally habitable, and it is along this strip that the Trans-Siberian Railway runs.

In recent years Russia has been making tremendous efforts to duplicate this link, and in particular that part of it which depends upon the ferry crossing of Lake Baikal. Three thousand miles to the east of the Urals by the most direct route, crossing Manchuria, lies the great base of Vladivostok, and the seaboard province of Primorsk, all that is left of a once much larger Russian eastern empire. It is cut off from European Russia more effectively by this inhospitable land link than from any place of significance the same distance away by sea. Moreover, this tenuous land link is bounded to the south by areas in which the prevalent religion, Islam, is experiencing a new and aggressive revival—or by the less than friendly Chinese.

History illustrates the isolation of the Russian Far East. In the Sino-Japanese War of 1904/5 the Russians were defeated on land and sea, and finally, their Baltic Fleet, arriving too late to save Port Arthur, was almost totally destroyed in the sea battle in the Straits of Tsushima. In the peace that followed Russia was compelled to give up, not only the naval base of Port Arthur, but also large parts of her former eastern empire—namely, Manchuria, Korea, and the island of Sakhalin. Primorsk, with Vladivostok, were all that was left. Only in 1945 did Russia recover the northern half of Sakhalin.

Admiral Gorshkov

It is most unlikely that the great Russian Admiral Gorshkov, creator and Commander-in-Chief of the modern Russian Navy, has not studied the Sino-Japanese War, and considered the reasons for the loss of Russia's Far Eastern Empire of the early 1900s. He can hardly have failed to conclude that the security of what remains in the Far East is dependent upon sea communications, and a powerful Pacific Fleet in being. Very likely the same conclusions are among the reasons for the great effort made by Russia to maintain a sea route, not only north-about through the Arctic Ocean, but through the warm water seas as well.

To do this demands not only ships, but suitable bases located in friendly areas; in turn, this demands more ships to supply the bases, and more forces to ensure their security; and still further, it demands freedom to fetch and carry supplies such as fuel oil or aviation gasoline to stock up such bases. Each requirement brings another, and so the whole process feeds upon itself until it

Russia's newest aircraft-carrier, "Minsk"—a sister to "Kiev" and second ship in the "Kuril" class—photographed off Crete in February this year by an R.A.F. Nimrod. In July "Minsk" arrived at Vladivostok to join the Soviet Navy's Far Eastern Fleet

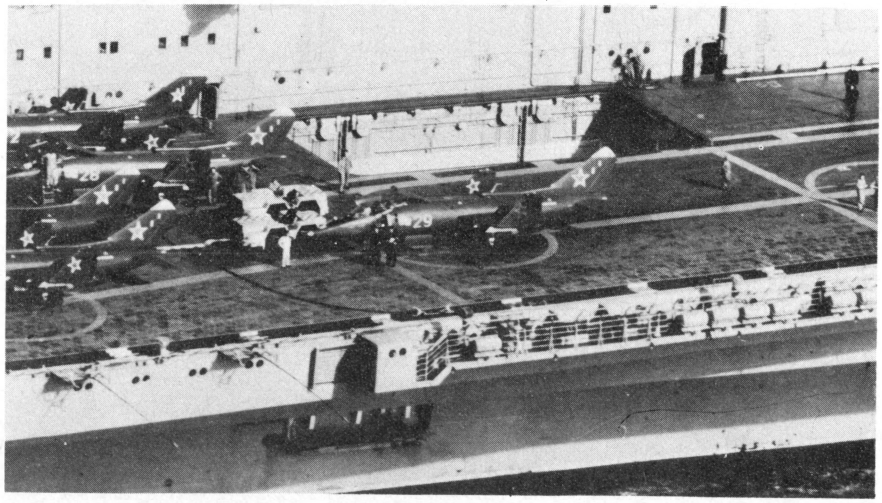
becomes a further expansion of empire on its own account.

In this way, one can regard the new Russian bases along the sea routes linking the Far East with the Atlantic Ocean—for example, in Angola and Mozambique—and with the Black Sea, through the Mediterranean, such as provided by Libya and Aden. No doubt seen through Russian eyes the provision of bases bordering the sea routes to the Far East are still inadequate, and Russian activities in Africa and the Middle East support this view. The objectives seem clear, and in fact the aims of Russian-dominated Communism, and Russian Imperial ambitions, seem to hang well together; to be in fact the two sides of the same coin.

Is this what Russia is doing? Is this to become an attempt under the new regime to regain the Empire lost by the Tsar in 1905? But today's approach to Imperialism is more practical, and backed by the realisation that world-wide sea power is likely to be not only the means of by-passing military stalemate in the West, and a shield in the Far East, but the ultimate key to a Russian Empire such as no Tsar ever dreamed of.

If this is the case, then lack of positive action to help Vietnam seems to indicate that, while Russia still considers NATO too strong in the West to diminish in any was her forces there, she still considers the Eastern Empire, and the routes leading to it, to be too vulnerable yet to chance provoking a conflict there. Russian naval expansion is startling. Is it now likely that in the final decades of the present century the Russian Navy will become the dominant factor in world power and empire? Only Gorshkov knows!

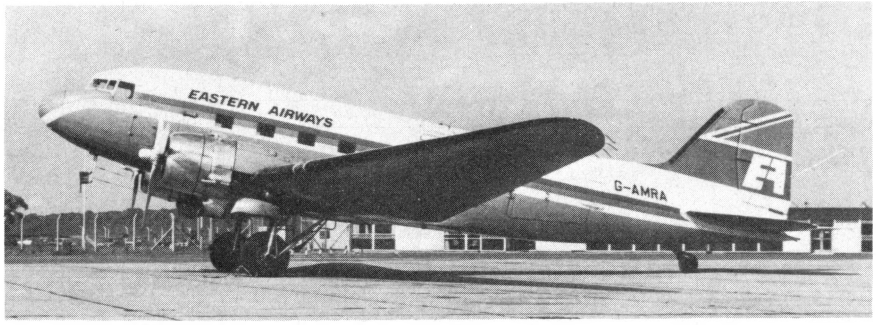
Five Yakovlev Yak-36 "Forger A" V/STOL combat aircraft aboard "Kiev". Aircraft complement of these ships seems to be about ten Yak-36s and twenty-five Kamov Ka-25 "Hormone" anti-submarine helicopters (Photo: U.S. Navy)



Humberside Airport, 19th June—where else would you see three airworthy Douglas DC-3s together in Britain these days! Home base of the Lease-Air/Eastern Airways DC-3s G-AMPO, G-AMRA (close-up below) and G-AMYJ, now being used by the Post Office to speed up mail from various parts of the country to Liverpool/Speke (Photos: P. H. T. Green)

Dear Sir . . .

Letters and photos of general interest are welcome and will be considered for publication—but they should be kept as short as possible. Will readers requiring acknowledgment of their letters please enclose a stamped addressed envelope.



Commonwealth wartime aircrew

You were good enough, some time ago [May issue, page 187—Ed.] to indicate an interest in our 1980 Commonwealth Wartime Aircrew Reunion—to be held in Winnipeg on 18th–21st September 1980. We have already received enough individual responses from former aircrew in the United Kingdom to make it look as though a charter-flight plane load could be a distinct possibility.

To look into this—and in any event to act as a co-ordinator of the 1980 venture so far as registrants from the United Kingdom are concerned—we have been lucky enough to get Mr. Gerald Boak to volunteer to act as our U.K. co-ordinator. If you want to be kept abreast of plans and possibilities, perhaps you would like to write to Mr. Boak. His address is: 8 Trenchard Court, Green Lane, Morden, Surrey SM4 5NY, England.

Hoping to see you at the 1980 Reunion.—*D. M. Peden, Q.C., D.F.C., Chairman, P.R. & Publicity Committee, Wartime Reunion, P.O. Box 1702, Winnipeg, Manitoba, Canada R3C 2Z6.*

Cruzeiro's fleet

Having read the VARIG and Cruzeiro airline histories by G. G. Endres in the June and July issues, I was impressed by the mass of individual aircraft details and historical photographs. Since the pre-war and wartime fleets stem mostly from German sources, I took the opportunity to cross-check these details with our material. Only a few additions and corrections need to be made:

P-BAKA/PP-CAK, a Junkers F 13fi, had the c/n. 725 and not 745.

P-BAMA was restored to Lufthansa as D-1626 "Flensburg" in 7/31 and became D-ARIP in 1934.

P-BAQA was ex D-1768.

PP-CAU was D-OKUV after D-2271 early in 1934 for a few months prior to transfer to the PP- register.

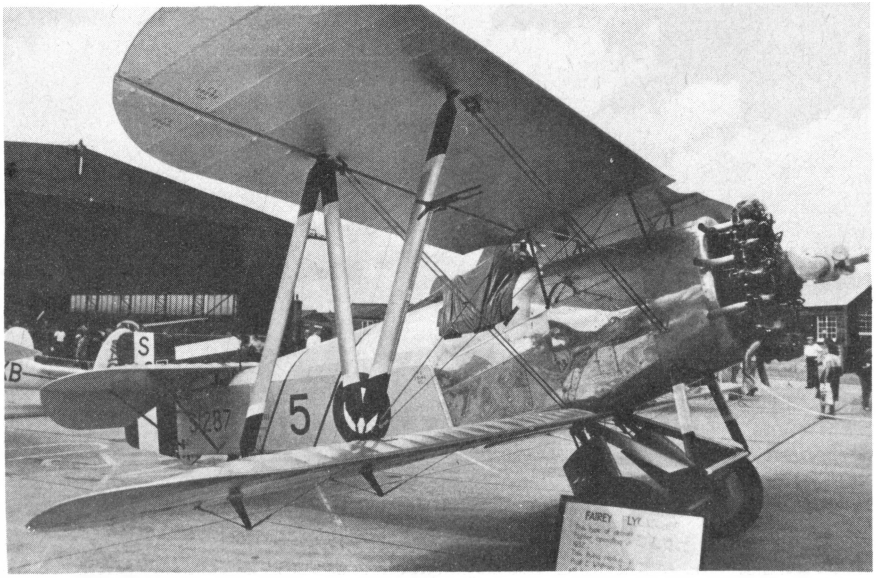
PP-CAX became LQ-ZBD.

PP-CBA became U.S.A.A.C. UC-79, serial 42-52883.

PP-CBR was ex D-AQUQ.—*P. M. Gerhardt, Bietigheim-Bissingen, West Germany.*

[*I doubt if PP-CBR went on to the German register between service with SEDTA in Ecuador and delivery to Cruzeiro, but perhaps Mr. Gerhardt could elaborate? P-BAKA/PP-CAK, Junkers F 13, is shown on the Brazilian register as c/n. 745, but I agree that c/n. 725 is more likely to be correct; c/n. 745 was Aerolot/LOT P-PALL/SP-AAL. —Günter Endres.*]

John Fairey's magnificent Fairey Flycatcher replica "S1287" (G-BEYB) first flew on 23rd July. It is seen at R.N.A.S. Yeovilton on 3rd August (Photo: Elfan ap Rees)



Warneford, V.C.

An Exhibition on Flt. Sub.-Lt. R. A. J. Warneford, V.C. is now under preparation at the Fleet Air Arm Museum and will open to the public in October 1979.

We are seeking the loan of any memorabilia connected with Rex Warneford for possible inclusion in the Exhibition and wonder whether any of your readers who personally may have known him, or who may have items of interest connected with him, would please contact: *Curator, Fleet Air Arm Museum, Royal Naval Air Station, Yeovilton, Somerset BN22 8HT (Tel.: Ilchester 840551 – Ext. 528).*

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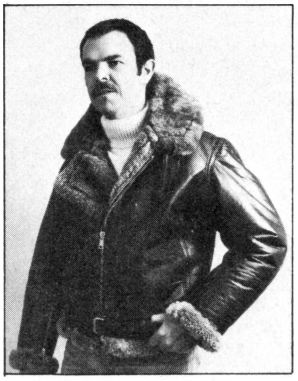

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This year the Popular Flying Association's Annual Rally was held from 6th to 9th July at Leicester, having outgrown its customary venue at Sywell. More than 550 visiting aircraft participated, of which some sixty came from overseas

Left: *Veteran Morane-Saulnier MS.317 F-BCNL from the Salis Collection at La Ferte Alais*
Below: *From Switzerland came this Rutan VariEze, HB-YBG, which attracted much attention and won the Concours d'Elegance award*

Flying for Fun at Leicester

by MICHAEL J. HOOKS

Shield Xyla G-AWPN appeared in a new paint scheme and with a two-bladed propeller, fitted since the 1978 Sywell rally

A newcomer this year was FRED Series 2 G-BBBW, powered by a 1,500-c.c. VW and built by D. L. Webster of Ilkley

Above: *An unusual visitor which sorely tried the recognition experts was this Piel CP.604, F-PYES*

Above: *Another unexpected arrival was Vecta Geronimo N4422P, a Piper Apache conversion*

Below: *First of its kind to be completed in the U.K., Sturgeonair MJ7 Mustang G-BEFU lives at Redhill*

Below: *Most meritorious flight award went to the pilot of this Bowers Fly Baby, LN-BGY from Norway*

Worm's Eye View

Teenage memories of Croydon as World War II loomed

by BRIAN HAIMES

Composite view of Handley Page H.P.42 G-AAXC "Heracles" over Croydon with the terminal and control tower in the foreground and Imperial Airways hangar on the left

AS MANY readers will know, the focal point of British civil air transport before World War II was the aerodrome which was established at Croydon in 1928. It was an expanded version of the aerodrome which had been in use there since 1915. Its greatest days were perhaps those of the early to mid-1930s when the height of sophistication was symbolised by a Handley Page H.P.42 standing in front of the famous square control tower with its steel spire.

Forty years ago this great era came to an end with remarkable suddenness. In a short burst of hectic activity at the end of August 1939 the civil airlines departed and three fighter squadrons moved in as part of the defence of London. It was a considerable upheaval, about which records seem to be scanty and inaccurate. For that reason I offer some personal impressions of the period which may shed a little light in an obscure corner; they may on the other hand merely add to the confusion.

My original interest in Croydon was entirely juvenile. By the summer of 1938, when I was 14 years of age, my family had been living for three years in a newly built house about a hundred yards or so from the western fence of the grass airfield—just behind a long, curving north-south road called Foresters Drive. This may seem a parochial note but it has a certain historical significance.

From 1924 onwards pilots and airline managements complained that Croydon was too small. It was also laid out on the side of a hill. The best areas for expansion (to avoid the slope) were to the east and west. The new terminal buildings of 1928 were placed on the east side on the Purley Way (the main road from London to Brighton, bypassing Croydon town). The western boundary was set by the building of a new road—Foresters Drive.

This road was opened by the Air Minister, no less, in 1928 and its name, like that of the Purley Way, crops up endlessly in accounts and records from 1928 to 1958. Many of these make no sense unless one realises that the names of the roads are synonyms for the eastern and western boundaries of the airfield. Industrial archaeologists may care to note that nearly all the Croydon Aerodrome buildings of the 1930s are still intact and readily identifiable.

The view of the aerodrome from the back of our house was rather frustratingly blocked by a small copse of high trees, in which a red light burned at night. On the other hand, the copse did add considerably to the drama of everyday life. I think this may have been because pilots used it as a marker. Many of them certainly tended to land or take off close to one side or the other (north or south, that is) rather than directly over the top.

In good weather, when the wind blew from the west, as it usually did, endless little aeroplanes would suddenly appear a couple of hundred yards away round the north side of this copse. De Havilland Tiger Moths, Leopard Moths, Fox Moths, Puss Moths, Dragons with blunt nose and square wingtips, D.H.86s with all the blunt bits rather sexily smoothed out, General Aircraft Monospars, Airspeed Envoys, and occasional strange visitors from foreign parts, would struggle up off the ground, engines thrashing away with almost no observable effect. As they reached about 800 ft. nearly all audible sound would cease as the pilots throttled back from take-off power.

Since no one ever bothered to tell the local residents what was going on, in those days before the appearance of the ubiquitous public relations officer, these sudden silences were, for the layman, quite indistinguishable from engine failures. After a bit, having observed that none of these little aeroplanes ever actually crashed (though the big ones sometimes did), I became quite blasé about the situation, but light never seemed to dawn for my mother. She lived endlessly on the brink of heart failure, in a state of mind which would probably have been worth thousands of dollars in an American court.

Far more dramatic, when the wind was from the east, was the sudden arrival of a Handley Page H.P.42 on the final stage of its approach. One would be sitting in the back of the house, minding one's own business, when, without the slightest warning, all

engines throttled back, one of these monsters would suddenly appear directly over our garden, at a height of about 60 ft., swooping down in a fluttering rush of air through struts, wires, undercarriage and visibly turning propellers. It would be gone almost as soon as it had come, like a cross between a giant dragonfly and a windmill, leaving the topmost branches of the spinney bent and swaying in the sudden breeze.

The H.P.42s must have had a pretty short take-off run and very fair rate of climb because, if they took off to the west, they were usually at 2,000 ft. or so shortly after clearing the boundary. I wouldn't bet on that figure because in those days I had virtually no experience of height estimation. Even so, Captain Walter Rogers, an H.P.42 captain of Imperial Airways, lived opposite us and when he passed overhead, on his way to Cairo or wherever, it was quite usual to see an arm come out of the left-hand window of the cabin and wave as he passed over. Like most of his contemporaries he had grown up in open cockpits and probably liked to have the window open.

Captain Bernard Frost of BOAC, who also flew with Imperial Airways before the war, told me more recently of another bonus of the open window. On the northern edge of the aerodrome, where aeroplanes had been assembled in World War I, lay the Bourjois scent factory. A mile or two further north was the sewage farm on the borders of Beddington and Mitcham. In bad visibility, if you had a good sense of smell, these two guides provided an entirely reliable blind landing system—he said.

I will not go on about the attractions of Croydon in the early and mid-1930s. Suffice it to say that they enthralled me and I spent every moment that I could there. Probably the only event which could have deflected me from total absorption in the aerodrome and its aeroplanes was an opportunity to take an active, official part in some aeronautical affair—as opposed to prowling illicitly round other people's aeroplanes.

Such an opportunity occurred around the late summer of 1938 when I heard that a Croydon squadron of the Air Defence Cadet Corps was to be founded. There already existed an Air Scout branch of the Boy Scout movement but it was in some unattainably remote place—Watford, I think—and Christian living in khaki shorts and funny hats had no appeal for me. The Air Cadets, founded by the Air League of the British Empire in the spring of 1938, were apparently going to be a junior branch of the Royal Air Force. That was just my cup of tea.

Joining the A.D.C.C.

The very next evening I presented myself at a small office behind the Imperial Airways hangar to see the man in charge. He turned out to be a Mr. Fox who was, I think, works manager for Surrey Flying Services, one of the small companies living in the hangars on the north side of the aerodrome. Mr. Fox was a handsome, clean-cut, friendly man, probably in his thirties, not very tall, with black hair brushed straight back. He was to be the squadron leader and all the potential recruits like myself were asked to attend a meeting in the Davis Theatre, then in Croydon High Street but demolished about twenty years ago.

On the great day I was there with two friends and what seemed like a couple of hundred others. I can remember nothing of what we were told but I was entranced by the appearance of a neat, fair-haired fellow they had on the stage wearing the new uniform. This had started out as a rather weird affair of shirt, slacks and a forage cap with the badge on the wrong side. This get-up made its wearers look like scruffy irregulars in the war then going on in Spain. Perhaps someone objected. What we now saw was a very smart affair, almost indistinguishable from the R.A.F. other ranks' version, except for its silver buttons and light blue shoulder flashes. The only thing I had against it was that it buttoned up at the neck while the R.A.F. had recently gone in for collars and ties.

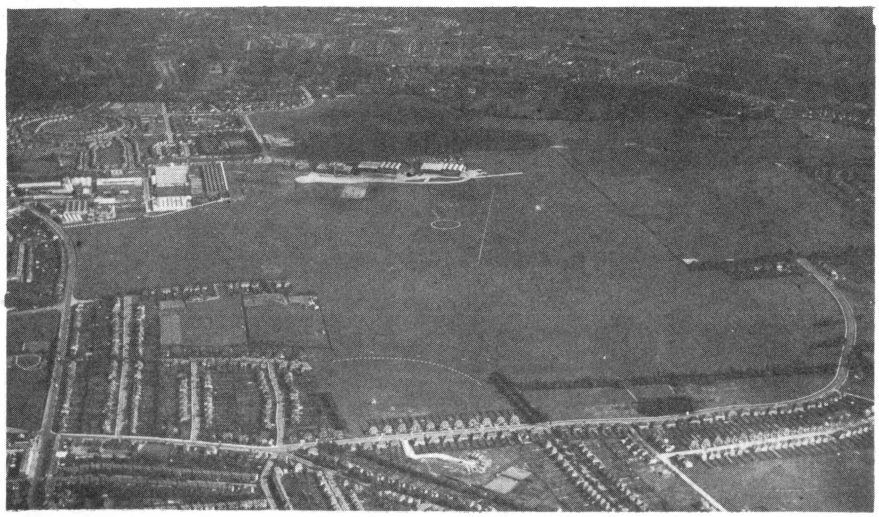
The new Croydon squadron had been comparatively slow in getting started so our number was a high one, 66, though we did get a letter F after it for being one of the first hundred founder squadrons. I was very proud of that F. The squadron headquarters was in an old, empty house in Wellesley Road, Croydon—much further from the aerodrome than my own home—and throughout most of the winter of 1938/39 I cycled over there one evening a week to be taught drill by a fierce little man who wore a civilian suit and a trilby hat, even indoors. In the extraordinary way that military organisations have, the main thing we had to learn was how to fall in in two ranks and then form fours. Falling in in four ranks in the first place was apparently too difficult and, anyway, if we had done that half the need for drill and drill sergeants would have disappeared.

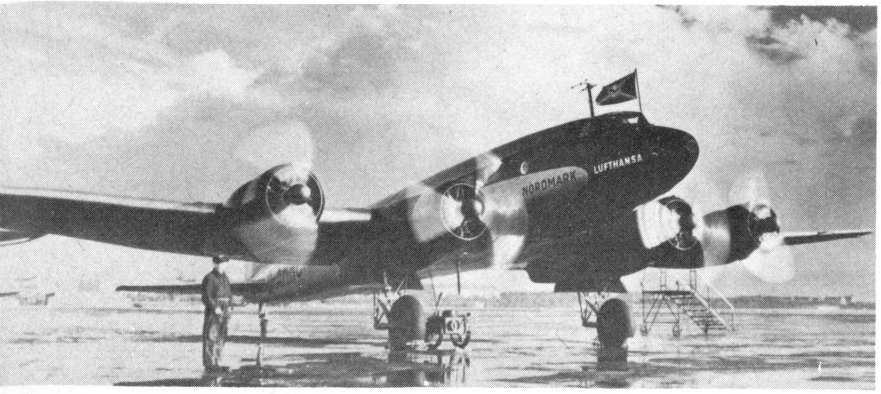
In addition to drill we usually had a lecture on the design, construction and maintenance of a Gipsy Six aero-engine or aircraft instruments. They must have been good lectures since I could still give a fairly convincing one myself on the inverted Gipsy Six and its carburettor system. The lectures were mostly given by a P/O Coffee, whose name lent itself to songs about being mixed up with the toffee in the quartermaster's store. I don't remember any significant part being played by the three other officers. They were all Flight Lieutenants—Ackers, a large but not very impressive man who worked in a local store; Browning, a thin, gentlemanly fellow with grey hair; and Geoffrey Dorman, a fattish, cheerful fellow who endeared himself to some of us by treating us as equals and entertaining small groups of us to coffee, after parades, in his cluttered bed-sitter in South Croydon.

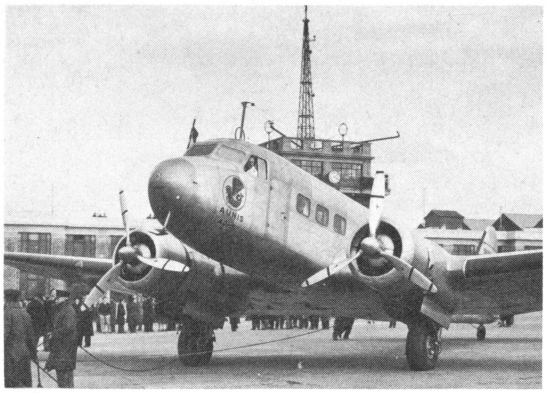
Meanwhile, we anxiously awaited the arrival of our uniforms. When they eventually came (at a cost of, I think, 35 shillings, to be paid at 3d. or 6d. a week) I was startled and enormously proud to discover that I was appointed a sergeant. Buying and sewing on the stripes was an important ceremony and I used to spend hours pressing that thick serge uniform for parades.

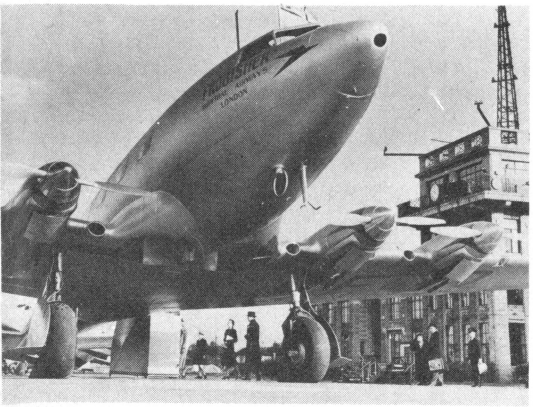
After I got my stripes I think I became quite a reasonable drill sergeant, and I enjoyed it, but 66 Squadron had one very great defect—we never went anywhere near an aeroplane. Perhaps the officers were too busy getting us all organised that first winter. Or perhaps they thought we were all going to be

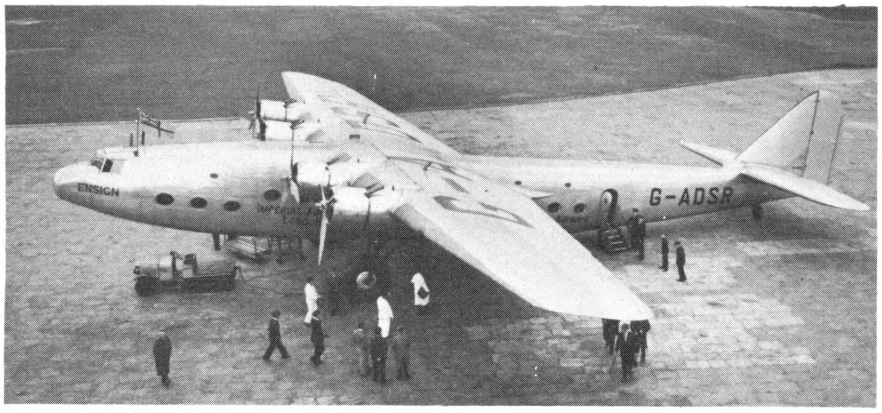
Croydon Airport from the west with the terminal and main maintenance area in the distance (Photo: "The Aeroplane")











Top Left: *Lufthansa's Focke-Wulf Fw 200 Condor D-AMHC "Nordmark".* Right: *Bloch 220 F-AOHE "Aunis" of Air France at Croydon in March 1938 (Photo: "The Aeroplane").* Bottom Left: *De Havilland D.H.91 Albatross G-AFDI "Frobisher" at Croydon; the box-like structure seen below the aircraft was a special set of boarding steps.* Right: *"Ensign" herself, the first Armstrong Whitworth A.W.27, G-ADSR, at Croydon in 1939*

mechanics anyway. I saw things quite differently. Without reference to fitness, training, career prospects or anything else, I had decided that I was going to be a fighter pilot. I must have been the absolute prototype for Walter Mitty, endlessly screaming through the skies of my own private fantasy with the machine-guns hammering away. They went rat-tat-a-tat rather than ta-pocketa-pocketa, because they were English machine-guns, not American, and I always won, naturally.

Things began to look up in the spring of 1939 when—wonder of wonders—the announcement was made that there were going to be gliding courses in the summer. I could hardly get my name down fast enough and it was, of course, accepted. I was absolutely delighted. Gliding was obviously a step in the proper direction and in the month or so before the courses were to start I was full of the prospect. Then, about two weeks before we were actually due to go, F/Lt. Browning called me in to his office to tell me that in order to go on the course one had to be sixteen years of age. Despite my exalted rank I was only fifteen and would not reach the required age until November so I couldn't go. He was very kind about it but that didn't soften the blow.

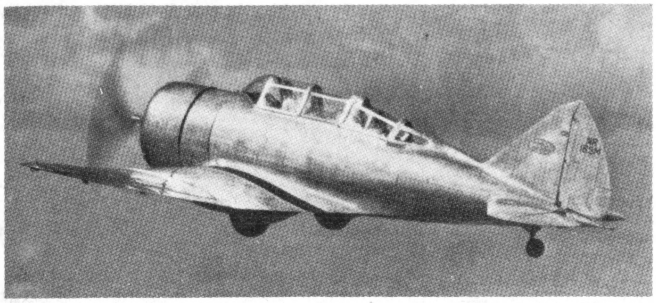
Even worse was what happened about my replacement. This was a friend of mine, Harry Gould, who was also a sergeant or a corporal and was a year older than I was. As the only son of a prosperous vet, Harry not only had a motorcycle but also knew how to drive a car. Off he went on the course, volunteered enthusiastically to drive a towing truck and promptly backed it into the glider!

Avid spotter

Membership of the A.D.C.C. did not, of course, hamper my avid observation of anything aeronautical for as many hours a day as I could spare, seven days a week. Nothing very significant (to me) had been happening at Croydon during the autumn and winter of 1938/39 but in September 1938 Neville Chamberlain had flown to Germany twice, from Heston in a Lockheed 12 and a Lockheed 14 owned by British Airways—thus making Imperial Airways look a bit sick. *Flight* was quite rude about Imperial Airways and the Air Ministry, without actually mentioning them, saying that the Prime Minister chose British Airways because that company had "insisted, against considerable opposition, on buying the type of transport aeroplane needed for a fast and efficient service". At the same time they rather spoiled the effect by printing a celebratory feature on No. 42 Squadron, a torpedo bomber unit of the R.A.F. This was still tottering around in Vickers Vildebeest biplanes, but not a word of criticism appeared about them.

A similar obsolescence pervaded the anti-aircraft and air raid precautions systems. During the Munich crisis of 1938 the sole defence of Croydon consisted of one gunner subaltern, one gun and six men. There was also some desultory digging of trenches between the main building and the hotel and that was all. Perhaps everyone else, like myself, simply didn't believe that there really would be a war. Perhaps they believed Lord Beaverbrook whose *Daily Express* solemnly printed every day on its masthead "There will be no war this year or next year either" throughout 1938 and, I believe, right through 1939 until the day the war actually broke out. How they explained that away, I can't remember.

Far more interesting to me was the fact that in the October the first Armstrong Whitworth Ensign for Imperial Airways actually arrived at Croydon—a four-year-old design delivered two years late. Knowing nothing about the terrible problems the test pilots had suffered with lack of power and a badly designed control system, and not realising that the high-wing monoplane was a dead duck—an ignorance I apparently shared with the Imperial Airways management—I thought the Ensigns were terribly impressive. The wheels stood even higher than I did (getting on for 6 ft.) and the wingspan was over 100 ft. The carpeted floors and cloth-covered armchair seating were also a luxurious improvement on the H.P.42



The Seversky 2PA "Convoy Fighter" which Major Alexander Seversky flew in to Croydon during a demonstration tour of Europe. He hit a fence; date was 1st April 1939

Worm's eye view . . .

style which I remember as being leather-cushioned metal frames with their whole skeleton showing, though I may be confusing them with something else.

By November 1938 five Ensigns had been delivered and a fine sight they made all standing out on the tarmac together—since there wasn't the slightest chance that they would fit into the hangars, which were reserved primarily for aircraft being overhauled. In December the Ensigns went into service, after a fashion. Three of them were introduced to the Christmas mail run to Australia. Not one of them actually completed the flight and the whole lot disappeared from Croydon at the beginning of 1939, having been sent back to the makers.

The de Havilland Albatrosses didn't seem to be faring much better. I thought they were among the ugliest looking aeroplanes I had ever seen. More important was the fact that the first one had broken its back after a heavy landing at Hatfield during the Munich crisis. It was quickly replaced by the second, which was flying by the end of the month. By January of 1939 it was in service, and before the end of the month the third had been delivered. But Croydon was notorious for having one of the roughest surfaces anywhere and before January was out one of the Albatrosses had suffered a collapsed undercarriage leg after a skid in the mud and a collision with the edge of the concrete apron in front of the tower.

The need for new and reliable aircraft for Imperial Airways was becoming urgent. The H.P.42s may look romantic now but this is what *Flight*'s correspondent had to say in February 1939:

"As I write there is a devil of a rattling noise outside my window. It is the sort of noise which might herald the arrival of the *Rocket* at Euston Station. Looking from my window I see Heracles arrive from Paris. Shortly afterwards an Air France Bloch arrives . . . and draws up on the other side of the Heracles, but what with the forest of spars and wires, the multiple tail unit and the bustling hedgerow of gadgets, I see the Bloch but dimly, as one gazing through a spinney.

"Heracles actually has mudguards on his wheels—sweet, eh? And unsuspected portholes, postern gates and the like. Under his nose there is something closely resembling a portcullis, half up and half down, and atop of the fuselage there seem to be, besides a cluster of little sticks, a genuine tin chimney such as you see on old-fashioned caravans."

That was meant as a joke, of course, but it had a basis in fact. The Bloch 220 was a sort of slabsided version of the DC-2/3, which Air France had recently introduced to replace their trimotor Wibaults. By now Lufthansa were regularly bringing the Focke-Wulf Condor to Croydon "carrying air hostesses", British Airways was using Lockheed 14s and even the Czech airline was operating DC-3s. Before the end of March so was SABENA. Imperial Airways was becoming increasingly uncompetitive.

In the military sphere, the R.A.F. representative at the Lockheed factory in the U.S.A. had just accepted the first of the two hundred Lockheed 14s which had been ordered by the British purchasing commission (complete with rather bogus-looking turrets but not yet rejoicing in the name of Hudson). The Air Force had roughly three squadrons of Hurricanes and three of Spitfires in the spring of 1939 but, apart from Kenley, the R.A.F.'s operations were academic to me since they all went on in places well out of my reach.

"Convoy Fighter"

Because of this, one of the high points of the spring of 1939 was my sudden glimpse, during a school football match, of a stubby, powerful little low-wing monoplane rumbling in overhead to land at Croydon from the south-west. It was the Seversky 2PA Convoy Fighter (sire of a line ending in the Thunderbolt) in the course of a U.K. demonstration and sales tour. Later that afternoon I scooted round to the aerodrome to have a closer look. To my amazement, Seversky, who was flying it himself, had landed across the shortest section of the airfield, and rolled straight across, through the fence and into the solid brick wall of the sports pavilion on the Croydon Gas Company's Sports Ground. The aeroplane remained largely intact but the collision did no good at all to the wall of the pavilion which was split from top to bottom. I suppose his brakes had failed or perhaps he hadn't realised that he was going fairly steeply downhill.

Whatever the problem, Rollasons or one of the other small firms on the north side of the airfield, which served as aeronautical garages and workshops, took his aeroplane in hand and it was soon flying again.

By the middle of 1939 warlike preparations were much in evidence in what one might call the outside world. There was a large body of opinion which found another war unthinkable and hoped that Hitler would just go away. At Croydon there was not the slightest sign of any kind of preparation for war.

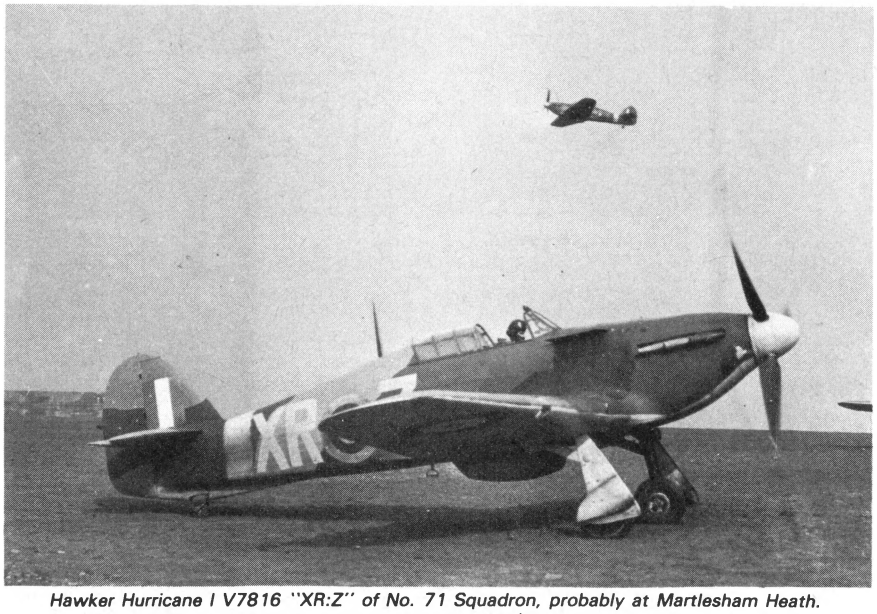
Flight's correspondent there was wittering on happily about tarmac overcrowding and how the new hangars promised by the Air Ministry would probably be ready in 1942, just when the airlines would decide to move out because the place was too small. He obviously didn't read the rest of the magazine. This was full of notices of awards and new commissions in the R.A.F., quite long lists of casualties in flying accidents, reports of new aircraft being delivered and old squadrons being re-equipped, articles by Francis Chichester on "Bombing by super-navigation" and encouraging chat about the strength of the R.A.F., most of which consisted of biplanes.

In that outside world, so to speak, a number of my older friends had joined the new R.A.F. Volunteer Reserve, various civilian acquaintances had blossomed as air raid wardens and the Territorial Army was recruiting vigorously. No. 66(F) Squadron of the Air Defence Cadet Corps went off to a summer camp in bell tents alongside the railway line at Shoreham Airport. Details of this do not concern us here, though it is perhaps worth recalling that I spent a large part of one night, quite unarmed, guarding the Shoreham railway bridge against the possibility of attack by the IRA. I also made my very first flight—5 minutes round the airfield in a Fox Moth, but tremendously exciting for all that—and one day we watched Fairey Battles flying over singly to France as part of an air defence exercise.

By the time we got back, towards the end of July, Imperial Airways had taken delivery of eight 27-seaters of the Ensign type and five or six Albatrosses. Together with the DC-3s, the Bloch 220s, and the Focke-Wulf Condors, these gave the tarmac a rather more modern appearance than it had had during the previous few years, though the H.P.42s were still in service, gradually being transferred to the shorter and less demanding routes. At the beginning of August, however, the new British acquisitions were somewhat overshadowed by the arrival of the first Junkers Ju 90 to be seen in this country. This was faster than the Ensigns, at 190-195 m.p.h. and it was, said *Flight*, "really a forty-seater, with forty seats and carrying forty passengers".

Your Questions Answered . . .

. . . by AIR-BRITAIN via its over 100 Information Specialists and Aviation Research Groups. Will readers please confine their enquiries to one specific subject, and note that information cannot be supplied separately by post. Unidentified rare photos welcomed for comment.—Ed.



Hawker Hurricane I V7816 "XR:Z" of No. 71 Squadron, probably at Martlesham Heath. No. 71 was the first "Eagle" squadron to be formed (Photo: Imperial War Museum)

Badges of the "Eagle" squadrons. No. 71's badge depicts a bald-headed eagle, indigenous to North America, with three nine-pointed stars enumerating the states from which the squadron's members came. No. 121—an Indian warrior's head. No. 133—another eagle with stars

U.S. "Eagle" squadrons

Q: *Please publish details of the "Eagle" squadrons which had American pilots serving in the R.A.F. in 1940.—C. Scott, Bideford, Devon.*

A: The first of the R.A.F.'s "Eagle" squadrons was No. 71 Squadron, which was formed at Church Fenton on 19th September 1940. Although a few Americans had joined the R.A.F. earlier, posing as Canadians, this was the first unit to be identified as an American squadron at a time when there was considerable propaganda value in this move. Only pilots were American, the leadership of squadrons and flights being R.A.F. in the absence of any qualified American personnel. The ground crews were provided from normal R.A.F. sources.

It was thought attractive to equip the squadron with U.S.-manufactured aircraft as an additional boost and a few Brewster Buffalo fighters arrived, to the pilots' consternation. These were completely useless by European standards and were soon replaced by a batch of Hurricanes supplied by No. 85 Squadron.

No. 71 Squadron moved to Kirton-in-Lindsey, Lincs., on 23rd November 1940 and became operational on defensive patrols on 5th February 1941. On 9th April it moved south to Martlesham Heath and became operational on Spitfire IIAs on 17th August 1941, having moved to North Weald on 23rd June. In September No. 71 received Spitfire VBs and flew sweeps over France until it returned to Martlesham Heath on 14th December 1941.

On 2nd May 1942 the squadron joined the Debden Wing to resume offensive sweeps over Northern France and took part in covering the Dieppe raid, almost its last operation before being transferred to the VIIIth U.S.A.A.F. as the 334th Fighter Squadron of the 4th Fighter Group.

A second "Eagle" squadron was formed as No. 121 Squadron on 14th May 1941 at Kirton-in-Lindsey and equipped with Hurricane Is. In July these were replaced by Mk. IIBs and some coastal convoy patrols were flown before conversion to Spitfires began in October. On 16th December 1941 No. 121 took its Spitfire VBs to North Weald and flew its first sweep on 12th February 1942. On 23rd September 1942 the squadron moved to Debden where, three days later, it became the 335th Fighter Squadron of the 4th Fighter Group.

The third "Eagle" squadron was No. 133 which formed at Coltishall on 1st August 1941 with Hurricane IIBs. After moving to Duxford on 15th August, it became operational on 26th September. On 8th October fifteen aircraft were flown to Eglinton in Northern Ireland but four crashed en route in the Isle of Man. The squadron converted to Spitfire IIAs during October and flew back to England on 2nd January 1942 and received Spitfire VAs, soon exchanged for VBs.

On 16th April 1942 No. 133 flew its first sweep, staging through West Malling and moved south to Biggin Hill on 3rd May. In September it converted to Spitfire IXs but three days before joining the other "Eagle" squadron in the 4th Fighter Group as the 336th Fighter Squadron, it had the misfortune to lose eleven of its aircraft when they had to make forced landings in Brittany after a navigational error.

None of the squadrons was reformed during World War II but No. 71 had a post-war career for a period flying Vampires, Sabres and Hunters in Germany.

It has been often recorded that No. 71 was equipped with Masters. This was due to an official photograph being released of a formation of Masters of No. 5 Flying Training School with the caption that the occupants were pilots of the American Eagle squadron. No. 71 did not even get a Master "hack", only a Magister!—*J. J. Halley, Editor, Air-Britain "Aeromilitaria".*

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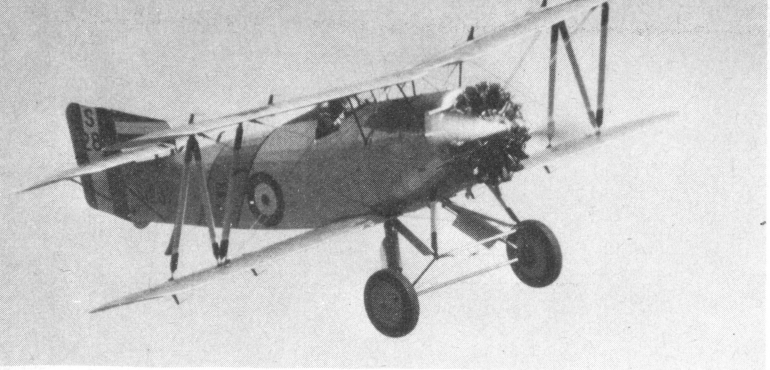
Loganair, first British domestic user of the Shorts SD3-30, took delivery of G-BGNA 28/6 for its daily Translink services connecting Aberdeen, Belfast, Edinburgh and Inverness with intercontinental departures from Prestwick to the USA and Canada (Photo: Randak, Glasgow)

Register Review

by A. J. JACKSON

Registration	Type	c/n.	Previous Identity	Remarks
United Kingdom				
G-AWVW	Aztec 250	27-4054	OY-DPF	Restored to Heath Street Car Hirings Ltd., London
G-BBCL	HS125 Ser. 600B	256015	G-BJCB	Restored to British Aerospace
G-BCDK	Partenavia P68B	32		Restored to D.K. Aviation Services Ltd., Elmdon
G-BFLY	Citation II	0080		Northair Aviation Ltd., Yeadon
G-BFZT	Cessna FR152	F.0356		Denham Flying and Training
G-BFZU	Cessna F152	F.0355		School Ltd., Denham
G-BGBM	SIPA 903	63	F-BGBM	P. G. Phelps, Elmdon
G-BGFD	Cherokee Six 300	32-540020	D-EOSH	Fairoaks Aviation Services Ltd.
G-BGIB	Cessna 152 Mk. 2	82161	N68169	Toon Ghose Aviation Ltd.,
G-BGIC	Cessna 172N	68002	N75834	Shoreham
G-BGMD	Twin Otter 310	629		Brymon Aviation Ltd.
G-BGNN	AA-5A Cheetah	0867		Cabair Ltd., Elstree
G-BGNO	AA-5A Cheetah	0871		
G-BGPA	Cessna 182Q	66538	C-GYBW	Arch Motor and Manufacturing Co. Ltd.
G-BGPF	Thunder AX-6/56X	206		Thunder Balloons Ltd., London
G-BGRZ	BN-2A Islander	116	ST-ADJ	Capital Aviation Sales (UK) Ltd., Staverton
G-BGSO	Navajo 310	31-12060		Aviation Beauport Finance Ltd., Jersey
G-BGTD	HS125 Ser. 700B	257073		Rank Xerox (UK) Ltd.
G-BGTJ	Cherokee 180	28-05083	OY-BIO	Serendipity Aviation Ltd.
G-BGTP	Robin HR100/210	188	F-BVCP	A. E. James and P. Houghton
G-BGTT	Cessna 310R	1641	N2AN	Air Atlantique, Jersey
G-BGTX	Jodel D117	698	F-BIDI	D. A. Davidson
G-BGTZ	Westland Sioux	WAS171	XT568	G.S.M. Helicopters Ltd.
G-BGVN	Cherokee Arrow 201	28R-18168	N2846U	Essex Aviation Ltd.
G-BGVS	Cessna 172M	F.0992	PH-HVS	Culham Air Ltd. (reg'd. 5/79)
G-BGVT	Cessna 182R	00244	N3762C	T. Hayselden (Doncaster) Ltd.
G-BGVU	Cherokee 180	28-5359	PH-AVU	Culham Air Ltd., Henley
G-BGVV	AA-5A Cheetah	0750		Cabair Ltd., Elstree
G-BGVW	AA-5A Cheetah	0774		
G-BGVX	Cessna 210P	0319		Rogers Aviation Sales Ltd., Cranfield
G-BGVZ	Cherokee 181	28-90528	N2886A	McCullough Aviation Ltd., Belfast; d/d via Gatwick 7/7
G-BGWB	Skyvan Series 3	SH.1966		Short Bros. Ltd., Belfast
G-BGWC	Robin DR400/180	1420		Headcorn Flying School Ltd.
G-BGWD	Robin HR100/285	524	F-BXRF	Mordell Engineering Ltd., Staines
G-BGWE	Scheibe SF-28B	5401		J. R. S. Pirquet, Henley
G-BGWF	Super Cub 150	18-7360	ST-AFJ	Farmair Ltd., Headcorn
G-BGWG	Super Cub 150	18-7606	ST-ABS	(G-BGWG and G-BGWH
G-BGWH	Super Cub 150	18-7605	ST-ABR	originally to Sudan 2/62 as
G-BGWI	Viva 65	522		G-ARSS and G-ARSR)
				Army Balloon Club, BFPO 30
G-BGWJ	Sikorsky S-61N	61819		Bristow Helicopters Ltd.
G-BGWK	Sikorsky S-61N	61820		
G-BGWL	Sikorsky S-61N	61821		
G-BGWM	Cherokee 181	28-90458	N2817Y	Western Flying Services Ltd.,
G-BGWN	Tomahawk 112	38-0918		Prestwick
G-BGWO	Jodel D112	227	F-BHGQ	J. R. Ramshaw, Manchester
G-BGWR	Cessna 206	0653	PH-OTD	Berrard Ltd., Blackbushe
G-BGWS	Enstrom Shark	1050		G. Cavendish, t/a Tern Fisheries, Chester (registered 11/76)
G-BGWU	Tomahawk 112	38-0788		Burnthills Aviation Ltd., Glasgow
G-BGWW	Aztec 250A	27-4587		Chargewell Ltd., London
G-BGWZ	Eclipse Super Eagle	007		J. S. Long, Langport, Somerset
G-BGXA	J3C-65 Cub	11170	F-BGXA	D. J. Dulborough, Crawley (registered in advance 3/78)
G-BGXB	Tomahawk 112	38-1007		F. A. P. Selby, Bexhill, Sussex
G-BGXL	Bensen B8M-V	HABW.1		H. A. Bancroft-Wilson, Clevedon, Avon
G-BGXM	Commander 690B	11374	5N-ALA	Dismore Aviation Ltd.
G-BGXN	Tomahawk 112	38-0898		Air Navigation and Trading Co.
G-BGXO	Tomahawk 112	38-0982		Ltd., Squires Gate, Blackpool
G-BGXP	Westland Sioux	WAN.41	XT191	Specbridge Ltd.
G-BGXS	Cherokee 236	28-11198	N28362	C.S.E. Aviation Ltd., Kidlington
G-BGXU	WMB.1 balloon	001		C. J. Dodd and partners, Wallingford
G-BGYA	Aerostar 601P	63294	N8235J	Mann Aviation Sales Ltd., Fairoaks
The following out-of-sequence registrations have also been issued:				
G-ADRW	Aerostar 601P	167	N99RW	Aircraft and Marine Avionic Services Ltd. (1935 registration not issued at the time because it was a radio call sign)
G-BIAN	AA-5B Tiger	1050	G-BGCI	Cabair Ltd., Elstree
G-BMAV	AS350B Squirrel	1089		McAlpine Helicopters Ltd., Luton
G-BSFT	PA-31 Navajo	31-642	G-AXYC	Simulated Flight Training Ltd.
G-BWJB	Thunder AX-8/105	197		Justinary and Brooks Ltd.
G-CRDA	Cessna 421C	0653	N37367	Northair Aviation Ltd., Yeadon
G-CRIS	Taylor Monoplane	10318		C. J. Bragg, Corringham, Essex
G-CSNA	Cessna 421C	0677	N5652R	Northair Aviation Ltd., Yeadon
G-DIVE	BN-2A Islander	2011	G-BEXA	Secretary of State on behalf of H.M. Queen, Brize Norton
G-DWMI	Jet Ranger 206L	45193		Glenwood Helicopters Ltd., Fairoaks
G-EENY	GA-7 Cougar	0094	N721G	Cabair Ltd., Elstree
G-FANL	Cessna FR172K	F.2873	N736XQ	Francis Lewis Ltd., d/d Luton–Staverton 5/6, f/f in U.K. marks 27/6
G-GALE	Seneca 200T	34-70191	N3052	Gale Construction Co. Ltd.
G-JCWW	Fellowship 4000	11135	PH-ZBT	Air Anglia Ltd., Norwich; Yeadon to Paris Air Show 7/6
G-JSSD	Jetstream 331	227	N510F	British Aerospace (Scotland) Aircraft Group (originally G-AXJZ)
G-LONG	Jet Ranger 206L	45227		Air Hanson Ltd., Denham
G-LOOK	Cessna FA172M	F.1234	PH-MIG	Citation Flying Services Ltd., Sherburn-in-Elmet
G-LRII	Jet Ranger 206L	45249		C.S.E. Aviation Ltd., Kidlington
G-MLAS	Cessna 182E	53826		Mark Luton Aviation Services Ltd.

Sailplanes, powered and unpowered—Left: *PIK 20E, G-SOAR, with 43 hp Rotax 503 retractable engine, one of only two on register, was at the Booker Gliding Championships 17/7.* Right: *G-BGCB, one of several registered Slingsby Type 65A Vegas, photographed at Lasham 1/7 (Photos: Roger Kunert)*



Left: *First flown 23/7, this completely realistic full size Fairey Flycatcher replica, S1287/G-BEYB, made its public debut at the Army's Middle Wallop display 28/7 (Paul Jackson).* Right: *The British Airports Authority's Commander 685 calibration aircraft, G-BFGB, landing at Stansted (George Pennick)*

G-MOLY	Apache 160	23-1686	EI-BAW	Rogers Aviation Sales Ltd., Cranfield
G-MONA	MS880B Rallye	1218	G-AWJK	J. D. M. Wilson
G-NATS	Commander 690B	11541	N81689	Tembo Records Ltd.
G-OABI	Cessna 421C	0664		Rogers Aviation Ltd., Cranfield
G-OAWA	Cessna 421C	0608	N88611	Northair Aviation Ltd., d/d Yeadon 19/5 (for A.W. Alloys Ltd.)
G-OBEY	Aztec 250	27-2569	G-BAAJ	Keller Bryant Ltd.
G-OBMW	AA-5 Traveler	0805	G-BDFV	Automania Airways
G-OCAL	Partenavia P68B	G-BGMY		D. K. Aviation Ltd., Elmdon
G-OCPA	EIRI PIK 20E motor sailplane	20213		B. J. Willson
G-ODAY	Cameron N-56	551		C. O. Day (Estate Agents) Ltd.
G-OSHH	Cessna 404	0410	N8792K	Northair Aviation Ltd., d/d Southend–Yeadon 30/4
G-OSPT	Navajo Chieftain	31-05209	N54362	SPT Aircraft Ltd., Southend
G-OTOM	Cessna FR172J	F.0424	D-EJGG	Citation Flying Services Ltd.
G-OVFR	Cessna F172N	F.1892		Airwork Services Ltd., Perth
G-OVMC	Cessna F152	F.1667		
G-PETE	Cessna 340A Mk. 3	0722	N2677V	Northair Aviation Ltd., d/d Southend–Yeadon 2/7 for Peter Cadbury
G-PIED	Aztec 250	27-54137		Air London (Executive Travel) Ltd., Gatwick
G-PUBS	Colt 56 Special Shape balloon	037		Lighter than Air Ltd.
G-RAIN	Maule M-5 Lunar Rocket 235C	7262C	N5632J	Velcourt (East) Ltd., d/d Luton–Staverton in US marks 29/6 (marks f/f on Navajo ex SE-FHM 6/11/78)
G-RIGS	Aerostar 601P	63281	N8220J	Rig Design Services Ltd., London
G-RKSF	Pitts S-2A	2192	N947	Anvil Aviation Ltd.
G-RPAH	Rutan Varieze	BH.1		B. Hanson, Gawber, Barnsley
G-SAVE	Navajo Chieftain	31-52102	N3518T	Jetsave Ltd., East Grinstead
G-SHOK	Cessna 421C Mk. 2	0466	N6800C	American Airspeed Inc. Ltd., f/f in UK marks Norwich 13/7
G-SILK	Aerostar 601P	63272	N8207J	R. York, London
G-SIXA	Douglas DC-6B	45326	OY-DRM	General Air Services Ltd., t/a Air Atlantique, Jersey
G-SIXB	Douglas DC-6B	45329	OY-DRC	
G-SKYB	FH-227B Friendship	539	N7817M	Skyways Aviation Ltd., Lydd
G-SNOW	Cameron V-56	541		M. J. Snow
G-SOAR	EIRI PIK 20E	20		C. P. Wither Ltd.
G-SOLY	Westland Sioux	WAT.82	XT806	Heliwork Ltd., Thruxton
G-SPIT	Spitfire 14		G-BGHB	D. W. Arnold, Blackbushe
G-STAN	Friendship 100	10131	VH-CAV	Air Anglia Ltd., Norwich
G-SURF	T-6 Harvard	15063	PAF.1710	Euroworld Ltd., Duxford
G-TALY	Jet Ranger 206B	8588		Alan Mann Helicopters Ltd.
G-TIDE	T-6 Harvard	6698		Euroworld Ltd., Duxford
G-TJAA	Boeing 707-139B	17903	9G-ACJ	Transasian Airlines Ltd., G-TJAC leased to Air Malta
G-TJAB	Boeing 707-123B	17640	9G-ADN	
G-TJAC	Boeing 707-123B	17651	9G-ACO	
G-TROT	Navajo Chieftain	31-52098	N35176	Trottair Airways Ltd., f/f in UK marks at Norwich 6/7
G-TSIX	T-6 Harvard	9725	FAP.1535	D. Taylor, Fritchley, Derby
G-TYRE	Cessna F172M	F.1222	OY-BIA	Watts Aviation Ltd., Staverton
G-WILL	Jet Ranger 206B	8576		Anglia Double Glazing (Kent) Ltd., d/d to Norwich 2/7
G-WIND	Boeing 707-323C	18689	N7555A	Tradewinds Airways Ltd., Gatwick
G-WWII	Spitfire 18		SM832	D. W. Arnold, Blackbushe
G-XMAS	Lance 300	32R-85130	N31793	A. G. Christmas Ltd.
G-YTWO	Cessna F172M	F.1396	PH-CIA	Citation Flying Services Ltd.
G-YULL	Cherokee 180E	28-5603	G-BEAJ	Lansdowne Chemical Co. Ltd., Oxford
G-ZEST	Lear Jet 35A	265		C.S.E. Aviation Ltd., Kidlington
G-ZOOM	Lear Jet 35A	236		

REGISTRATIONS CANCELLED

Registration	*Type*	*Identity*	*Reason*
G-ATOY	Comanche 260	24-4346	Beyond repair in forced landing at Elstree 6/3
G-AVKC	BN-2A Islander	4	Sold in the United States
G-AWGT	CL-44D-4	30	Repainted at Gatwick 24/6 for Cyprus as 5B-DAN
G-AXYC	PA-31 Navajo	31-642	Re-registered as G-BSFT
G-AYBH	HS125 Series 600B	25256	Sold in Ireland
G-AYOT	Scheibe SF-27M	6310	Crashed at Peronne, France 26/7/78
G-AYOV	Cessna FA150L	F.0104	Beyond repair in precautionary landing at Honiley 11/2
G-AZVN	Jet Ranger 206B	759	Beyond repair in accident near Stirling 30/6/78
G-BAAJ	Aztec 250	27-2569	Re-registered as G-OBEY
G-BASC	Bell 47G-5A	25107	Sold in Greece
G-BBJS	Sikorsky S-58T	58-1626	Sold to Helilift, Fornebu, Norway
G-BBXN	Jet Ranger 206B	8375	Sold in West Germany
G-BEMH	BN-2A Islander	832	Sold in Australia
G-BEMK	BN-2A Islander	834	Sold in the United States
G-BEML	BN-2A Islander	835	Sold in Australia
G-BEMO	BN-2A Islander	837	Sold in Indonesia
G-BERS	Thunder AX-6/56A	108	Sold in Holland
G-BEXA	BN-2A Islander	2011	Re-registered as G-DIVE
G-BFDJ	Bell 212	30632	Re-registered in Nigeria
G-BFZY	Short SD3-30	SH.3025	To Golden West Airlines as N334GW
G-BGCI	AA-5B Tiger	1050	Re-registered as G-BIAN
G-BGFR	Skyvan Series 3	SH.1964	Sold in Botswana
G-BGMY	Partenavia P68B	182	Re-registered as G-OCAL
G-BGMZ	Short SD3-30	SH.3028	To Chautauqua Airlines, USA
G-BGSR	HS125 Series 700A	NA0248	Sold in Canada
G-BPAT	Boeing 707-321C	19637	Repainted at Heathrow 28/6 for Zambia Airways as 9J-AEQ

PRODUCTION LINE

. . . Boeing 737 (21776) G-BMEC, d/d to Air Europe, Gatwick 8/6

. . . Cessna 421C (0677) G-CSNA, d/d Southend Yeadon 2/7 for Armstrong Aviation Ltd., Brough; (0653) G-CRDA, Robertson STOL, d/d to Northair, Yeadon 10/7 for Croda Chemicals Ltd., Cowick Hall

. . . Commander 690B (11530) N81734, Burch Engineering Ltd., d/d Yeadon Shoreham–Jersey 4/7 for UK registry; (11541) G-NATS, Nat Somers, d/d Eastleigh 11/7

. . . HS125 (25219) 4W-ACA, to Gulf International as 9K-AEA (Heathrow 9/7)

. . . Islander (878) G-BFNV, d/d to Loganair, Glasgow 19/4; (879) G-BFNW, to UK via Gatwick 20/7; (2015) G-BEXE, to Eastleigh for storage 29/6; 9Q-CMJ d/d via Eastleigh 1/6

. . . Jetstream T2 (268) XX485, f/f as T2 at Prestwick 29/3, d/d to No. 750 Sqn., Culdrose 24/4 coded '567'; (265) XX486, f f 15 5, d d 5 6 as "569"; (269) XX487, f/f 1/5, d/d 22/5 as "568"

. . . Tomahawk (38-0762) G-BGUA, d/d to Northern Executive Aviation, Ringway 6/7

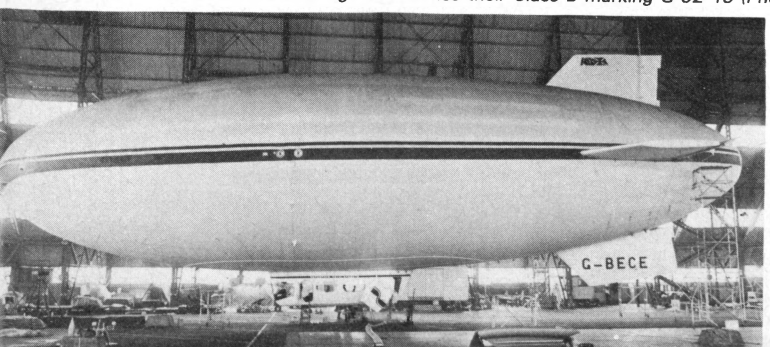
. . . Trislander VP-VAG d/d to St. Vincent via Prestwick 10/7

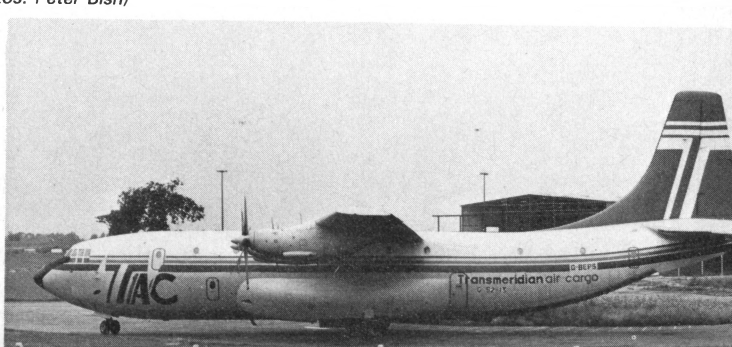
. . . Tristar 500 (1168) G-BFCE, d/d to British Airways, Heathrow 22/7; G-BFCB on 4/7

. . . Twin Otter 310 (616) G-BGEN, d/d to Loganair, Glasgow 19/4

. . . Viscount 761D (190) G-APZN, to Eastleigh as XY-ADH for Southern International Air Transport 14/7

Big stuff—Left: *The future of the AD 500 airship G-BECE, f/f 3/2, is now in doubt but it may be taken over by a Canadian firm.* Right: *G-BEPS, first of three Belfasts for Transmeridian's heavy lift division, has commenced the certification programme in conjunction with Marshalls of Cambridge and carries their Class B marking G-52-13 (Photos: Peter Bish)*





Left: *The latest addition to Partnair's fleet, King Air 100 LN-PAJ, c/n. B-85, visited Woolsington on 4/7.* Right: *Cessna 414A N114EA, c/n. 271, was delivered through Woolsington on 10/7 (both Ian MacFarlane)*

Airport Movements

Inverness/Dalcross

2/7	OY-DEZ	Hornet Moth, with OY-DVP and OY-ECH Tiger Moths
5/7	N171LS	Gulfstream I, c/n. 171; N78MD Falcon 10, c/n. 18, on 6/7
8/7	N9305V	Mooney Ranger, from Southend; N777PL Aerostar on 10/7
14/7	PH-CHB	Fellowship 4000, N.L.M.; TF-JMI Navajo P, c/n. 42, on 17/7

Aberdeen/Dyce

3/7	F-BRVJ	DR.340 Major; G-BGIE Xingu, Air Ecosse lease, on 9/7
22/7	N222BX	Bell 222, demo. to Air Ecosse; TF-JMI Navajo P on 26/7
26/7	D-BABI	VFW 614, c/n. G-009; D-CAPD Lear 35A, c/n. 179, on 27/7

Edinburgh/Turnhouse

1/7	OO-DTA	FH-227B, D.A.T.; YR-TPD Tu-154, Tarom; 'PB on 15 and 19/7
2/7	OY-DGH	Tiger Moth; OY-DVP and 'ECH with 'DEZ Hornet Moth on 3/7
4/7	109157	CC-109, C.A.F.; 136225 CH-136 9/7; 133393 T-33A/N 14/7
	HK-1410	B.707-359B, Avianca; A6-HRM Boeing 707 on 16/7
11/7	12491	VC-140B, U.S.A.F.; XR718:C Lightning F.3, L.T.F., on 12/7

Glasgow/Abbotsinch

20/6	F-BVTU	Friendship 162, Air Martinique; N54612 T-28B on 25/6
22/6	N3968C	Cessna 421; N7100B Cessna 411 on 26/6
30/6	HB-CCG	Cessna F.182RG; N90DM Falcon 10, c/n. 104, on 14/7
8/7	DM-SCL	Tu-134A, Interflug; CCCP86476 and '485 Il-62Ms on 15/7

Prestwick

29/6	23134	C-12A, U.S. Army; 50496 P-3C, U.S. Navy; N9FB Falcon 20
30/6	N8036R	Sierra; N54613 T-28B 3/7; N87471 Cessna 310 4/7, westbound
3/7	HZ-KA3	Falcon 20; N426 Geronimo 6/7; N1JN Falcon 10 15/7
9/7	115452	CC-115, C.A.F.; 5H-MRS Caribou; N1823B Citation on 16/7
13/7	CCCP47324	An-26, c/n. 7803, Aeroflot, with '325/7907, '338/7701, '339/7702 and '340/7704, delivery to Cuba
18/7	158971	U-21A, U.S. Army, with 18059, to U.S.A.; N33WA Cessna 402
20/7	N230RC	Rockwell 1121; N642DD Bonanza; 84003 C-130H, Swedish A.F.
21/7	N54608	C-47, ex Moroccan A.F. 92136, with N54610 ex 16141
	N5957M	Cessna 421B; N8055M Cessna 320B; N3968G C.421C on 25/7
23/7	84+11	CH-53G, W.G.A.F.; 23135 C-12A, U.S. Army; N7100B C.340D

Newcastle/Woolsington

28/6	40555	C-130H, U.S.A.F. 7 SOS, with 40561; 40559 on 10/7
	C-10	Troopship, Dutch A.F.334 Sqdn.; C-12, 334 Sqdn., on 10/7
29/6	50+83	C-160D, W.G.A.F. LTG 62; 121 Noratlas, French A.F., 9/7
2/7	XV732	Wessex HCC.4, Queen's Flt.; XL190 Victor K.2, 57 Sqdn., 4/7
25/7	WK162:A	Canberra B.2, with WK116:E; 70230 A-10A, U.S.A.F. 81 TFW

Leeds-Bradford/Yeadon

27/6	OO-JPG	Mooney 201; OO-ANN Cessna F.172H on 17/7, first visits
29/6	CF-QPD	Beech 3TM/18, c/n. CA-164, Capital A.S., to Prestwick
9/7	F-GBRF	Falcon 10, Ets. Roquette; EC-BMO Cherokee Six, c/n. 40132
10/7	N677S	Gulfstream II, c/n. 115; N600SR Citation, c/n. 0275, 12/7
15/7	LN-NAW	Cherokee Lance, c/n. 7780281; N3968G Cessna 421C 24/7

Blackpool/Squires Gate

12/6	I-PALS	Cheyenne; N1364J Rockwell 114 and N60253 King Air on 13/6
4/7	HB-UBC	Tiger Moth, c/n. 3956; HB-LHO Cessna 421B, c/n. 0885, 18/7
13/7	N1JN	Falcon 10, c/n. 106; N77SW Gulfstream II, c/n. 15, 21/7

Manchester/Ringway

26/6	VP975	Devon C.1, R.A.E., N1JN Falcon 10, Jack Nicklaus, 13/7
3/7	LZ-BEO	Il-18, Balkan; OO-SDR B.737-229C, SABENA, first visits
5/7	181	Noratlas, French A.F., coded 64-KT; 67/64-KA on 18/7
9/7	G-BGIL	Ecureuil, type first visit; N730T B.720-027, Aeroamerica
18/7	PH-CHB	Fellowship 4000, N.L.M.; F-BXOO Vanguard, E.A.S., 20/7

Liverpool/Speke

16/6	G-SKYB	FH-227B, Skyways; OO-SBW B.707-344, Sobelair
5/7	N2A	Goodyear Airship; N600SR Citation, Sperry, on 12/7
16/7	24471	T-39A, c/n. 276-24, U.S.A.F.; OE-FHP Beechcraft 25/7

Birmingham/Elmdon

25/6	OO-TEH	Boeing 737-2M8, T.E.A. on Britannia AW flight
29/6	SX-AHF	Lear 36; I-FJLC Cessna T.310Q; N3968G Cessna 421C 30/6
4/7	N90DM	Falcon 10; N99342 King Air 90 9/7; 5Y-BCW Seneca 21/7
8/7	PH-CHB	Fellowship 4000, N.L.M.; N4422P Apache

Northolt

26/6	057	Twin Otter, Norwegian A.F.; 1602 HC-130N, U.S.C.G., 29/6
3/7	6805	C-130H, Portuguese A.F.; 70401 Lear 25B, Yugoslav A.F., 3/7
20/7	B-680	C-130H, Danish A.F., collected Whirlwind S-883
23/7	61+16	Atlantic, West German Navy; LN-PAJ King Air 90 on 26/7

London/Heathrow

24/6	N5253A	Gulfstream II, C.B.S.; N88CF Citation I on 11/7
26/6	TP-01	Boeing 727-51, Mexican Govt.; PP-VMO DC-10-30, Varig; EC-DEA DC-10-30, Iberia, on 6/7, first visits
28/6	EC-DDV	Boeing 727-256, Iberia; 'DDX on 16/7, first visits
29/6	F-GBRS	FH-227B, T.A.T.; 'RR 2/7; 'RQ 22/7, Air France flights
30/6	OO-PSD	Falcon 20; OO-PJB 3/7; I-LIAB, Aeroleasing Italiana, 10/7
2/7	N7521A	Boeing 707-123B, Aeroamerica on Air Malta flight
3/7	HB-VFY	Lear 29, Aeroleasing; N88AT Falcon 10, c/n. 73, 17/7
18/7	SU-AZY	A300B-4, Egyptair; CCCP86500 Il-62M, Aeroflot, 21/7

Stansted

10/6	SE-DDD	B.727-30C, Transair; C-GRYN B.707-338C, Ontario, 15/7
27/6	C-GHPW	Hercules 30, Pacific Western; C-FNWF, Northwest, 18/7
5/7	5X-UCF	Hercules 30, Uganda AL; 5N-ABK B.707-3F9C, Nigeria AW
20/7	5N-ANN	DC-10-30, Nigeria; 5N-ANO Boeing 707-3F9C on 25/7
27/7	EC-DDZ	B.727-256, Iberia; 'DV 29/7; TZ-ADR B.727-173C 30/7

Norwich

6/7	SE-DAK	DC-9-41, S.A.S.; OY-KGR 20/7; HB-LHS Navajo 25/7
11/7	XJ319	Devon C.1, Royal Navy; XX146 Jaguar GR.1, 41 Sqdn., 23/7
25/7	9XR-MP	Cherokee Six, c/n. 288; D-EEGT Robin DR.400 on 27/7

Southend

6/6	N2055J	Cessna 188, with '57J, '71J, '72J, '73J and '99J
8/6	OO-GRI	Aeronca 7AC; N8486Q Cessna A.185 on 22/6, deliveries
26/6	EC-DFY	Rockwell 690; HB-UBC Tiger Moth 27/6; OY-DGH 28/6
29/6	OY-DEZ	Hornet Moth; OY-DVP, OY-ECH and N82AM Tiger Moths

Manston

19/6	319	Flamant, French A.F., coded DW; XS643 Andover C.1 6/7
3/7	XV263	Nimrod MR.1; XV258 and 85+07 CH-53G, W.G.A.F., on 5/7
7/7	5N-ARA	C-47; 5N-ARC DC-4 13/7, both left after repairs

Biggin Hill

6/7	N27840	Navajo; EC-CMM Cherokee Archer, c/n. 7405141, on 27/7
7/7	N3968G	Cessna 421C, c/n. 0422; N64762 Cessna 320 on 9/7
13/7	N108WG	Citation 551, c/n. 0008; N8055M Cessna 310 on 22/7

Gatwick

22/6	PP-VMQ	DC-10-30, Varig; F-GBTI Falcon 10; C-GTLU Falcon 20 30/6
27/6	N602BN	B.747-227B, Braniff; N15713 B.707-331C, Global, 7/7
28/6	N6834A	Aztec; N28362 Cherokee Six 29/6; N35251 Navajo 12/7
10/7	N5372C	Cessna 421C; N108WG Citation 551 13/7; N3892U Mu-2 16/7
18/7	N3968G	Cessna 421C; 1604 C-130H, c/n. 4633, Saudi A.F.
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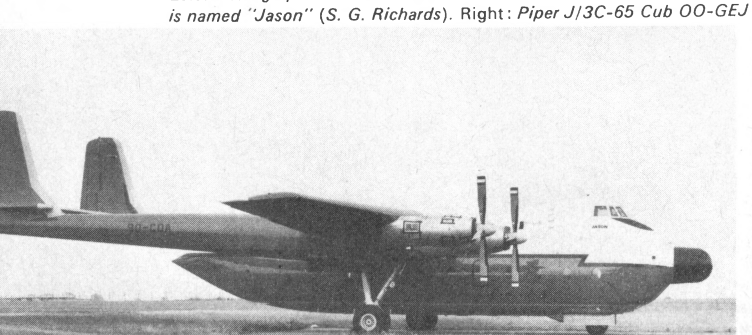
29/6	N214MD	Tomahawk; N3016K Cherokee Lance 16/7, deliveries
30/6	N801RA	Rockwell 680T, c/n. 1620-51, Guernsey-Prestwick
5/7	10364	HH-53B, U.S.A.F., also 50785 and 80284, type first visits

Left: *Photographed at East Midlands on 16/7, Otras Range Air Services' Argosy 9Q-COA wears a colourful orange and white livery and is named "Jason" (S. G. Richards).* Right: *Piper J/3C-65 Cub OO-GEJ visited Biggin Hill on 23/6 (Don Conway)*



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In addition to model displays by local clubs and I.P.M.S. Branches, there will be an open competition for modellers as well as separate competitions for I.P.M.S. members only, plus sales stands. Further information and competition rules may be obtained (S.A.E. please) from the Expo Co-ordinator—David E. Jane, 9 Grange Crescent, Sheffield S11 8AY (Tel: 0742-586269).

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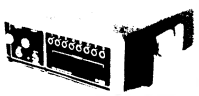

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It is not often that one sees a Britten-Norman Islander on skis, but ZK-MCB owned by Mount Cook Airlines has been thus equipped so that it can take tourists up to the glacier region of New Zealand's South Island—flights normally operated by Cessna 185As—see article in February 1974 issue

Aviation Bookshelf

Three from the past—North American P-51 Mustang, Boeing B-17 Fortress and Lockheed P-38 Lightning, photographed at Homestead Municipal Airport, Florida, on 2nd April by Harold G. Martin. The Mustang is embellished "Passion Wagon"

A Hostage to Fortune
by Ernest K. Gann (Hodder & Stoughton, £6.95)
For many years I have derived pleasure from reading Ernest Gann's superb flying books such as *Island in the Sky, Fate is the Hunter* and *Band of Brothers.* There was a time when *The High and the Mighty* appeared to be showing on television whenever I entered a hotel room after a long flight; and my wife and I used to sing the theme tune when our flights became rough, as they had a habit of doing.

Then there came Gann's *Flying Circus* which was largely the story of the development of the transport aeroplane, with delightful colour illustrations by Robert Parks.

A Hostage to Fortune is different. It is Gann's multi-sided life story and it tells much of the man that we didn't know about, particularly his involvement with film making. It also proves that he is a competent artist. For this reviewer, it is still Gann's writing on flight which has top ranking. How he nearly wrecked a Liberator and the Taj Mahal in one go is now widely known through the story's publication elsewhere, but much of the rest is new and I particularly recommend his descriptions of flying over the Canadian wastes and approaching and penetrating thunderstorms over West Africa—I like "We bounce through illuminated caverns and I manage to find a series of tunnels leading in the general direction of Accra." I have been a long way off track to avoid one of that storm's close relations.—*J.S.*

I Kept No Diary
by Air Commodore F. R. Banks (Airlife Publications, £6.50).
Your reviewer's involvement with aviation covers nearly forty-five years. Throughout that time "Rod" Banks has always been in the forefront of British aero-engine development, though his name is probably unknown to the general public. This book reveals the startling fact that his absorption in engine design development goes back even further—for over sixty years. After leaving school at 14, before W.W.I, he served an engineering apprenticeship for 2½ years and then joined the Navy. He was commissioned in the motor torpedo boat branch when he was officially too young to hold a commission at all.

Between the wars, as a specialist adviser on fuels, he was part of the team that won the Schneider Trophy for Britain. Later, his normal business contacts were at the level of Jimmy Doolittle in the U.S.A.; Fedden, Camm and Hives in this country; Udet and Milch in Germany. During W.W.II he was Director General of Engine Research and Development when powerplants were being developed for the Spitfire, Mosquito, Mustang and Lancaster. After the war he was on the board of Bristol. At the age of 80 he is still busily engaged as a consultant.

A career such as this (grossly compressed in this review) provides material for at least four books. As a result this single autobiographical volume is packed with interest and new insights. It is essential reading for anyone who cares about the real history of aviation, as opposed to romantic collections of rose-tinted anecdotes.—*B.J.L.H.*

The World's Air Forces
edited by C. Chant (David & Charles, £6.95)
From time to time "Air Force" books appear on the bookshelves and this reviewer's heart stops momentarily in the hope that perhaps at last a worthy successor to Green and Fricker's 1958 classic has arrived. Alas . . . not yet. This latest offering from David & Charles is what can perhaps best be described as a sheep in wolf's clothing. The cover says that it is "an illustrated encyclopedia of the air forces of every nation with full specifications of their equipment and details of their strength and organisation", but this is not strictly true.

Entries are in alphabetical order and that part relating to the Air Forces (rather than equipment specifications) bears a close resemblance to *The Military Balance 1978–79,* published by the International Institute for Strategic Studies. But then *The World's Air Forces,* according to the blurb, is compiled by an anonymous "international team of military authorities drawn from such organisations as the Institute of Strategic Studies (sic) . . ." Readers familiar with the *Military Balance* will know that there are no details of air forces' organisation except for a handful of major powers.

To add weight to what would otherwise be a slim volume, the authors have adopted the practice of giving a range of detailed aircraft specifications after most of the air force entries. Each aircraft type in use is described somewhere in the book after an air force entry for a country that uses the type. Missiles are similarly dealt with. Thus the "air force" entry for Denmark is followed by details of the F-100, with a photograph of the type in U.S.A.F. service and the SAAB 35 Draken with line drawing and two photos—one of a Swedish aircraft; cross-referencing indicates which other air forces use the type. If the reader wishes to find details of other types in use with the R. Danish A.F. he must turn to the index—F-104 for instance comes under the Jordan entry with photographs of Norwegian aircraft. The specifications themselves seem accurate, if unnecessarily detailed, but the photographs are mostly old, common and sometimes of prototype or pre-production aircraft, and although indexed they are not captioned. Sadly, the line drawings range from the indifferent to the indescribable.—*V.F.*

Jetstream—A Production History
by Alan J. Pardoe (Central Scotland Aviation Group, Flat 21, 104 Dalry Road, Edinburgh, £2.20 post free)
If he were here today, Sir Fred Handley Page would emit a sardonic chuckle or two at the way, twenty years after only meagre sales, his Dart Heralds have become a mainstay of Britain's short-haul routes. It is evident from Alan Pardoe's new and excellent booklet that he would be equally satisfied at the way the unhappy Jetstream is already enjoying a similar late success with twelve aircraft achieving utilisa-

tions exceeding 2,500 hours each per annum on U.S. commuter routes and their second-hand value way above initial cost.

The recent registration of the new Series 3100 prototype, G-JSSD, augers well for the future of an aircraft whose individual histories have been researched so thoroughly for listing in this book as back-up for a well-written analysis of its complex early difficulties. Add numerous unusual photos, a registration cross reference and a directory of owner/operators and you have another "must" for the enthusiast's shelf.—*A.J.J.*

Major Airports of the World
by Roy Allen (Ian Allan, £4.95)
There have not been so many books about airports published in Britain but some of the best known have been Roy Allen's earlier works, to which this new 128-page publication seems to be a sequel. Chapters deal with "Airport Types and their Location", "Airport Design", "Running the Airport", "Passenger Facilities and Amenities", "Work on the Ground" and "Tranquillity in the Air", followed by a few statistics, and then alphabetical coverage of some seventy of the world's airports, with brief technical details, some background and history. There are about 125 photographs, some double-spreads and many not previously seen.

This book is attractively produced and should find a wide market, but I am puzzled by the author's choice of airports. On the statistical page he lists the twenty top airports by 1977 passenger and aircraft movements ranking. Fifteen airports occupy the twelve top positions under these two headings, but Atlanta, occupying second place in both categories, does not appear in the body of the book; neither do Boston, Denver, Miami, Osaka, Philadelphia and San Francisco, although such places as East Midlands, Rhodes and Sharjah are included.—*J.S.*

Fighting in the Air
(Arms and Armour Press, £8.95)
According to the blurb this is a source book providing an authentic perspective on the development of aerial warfare over thirty years. Vol. VII in the publisher's "R.A.F. Museum" series, it contains an interesting compilation of official instructions to fighter pilots, on aerial combat techniques, from 1915 to 1944 approximately. These are: 1916—Fighting in the Air, by Major L.W.B. Rees; 1917—Textbook on Aerial Gunnery; 1918—Fighting the S.E.; 1918—Notes on Aerial Fighting; 1933—"Air Fighting" from the R.A.F. Flying Training Manual; 1940—Forget-me-Nots for Fighters, by 13 Group, RAF; 1943—Notes on Air Gunnery and Air Fighting by W./Cdr. E. M. Donaldson; 1943—Bag the Hun, which is not credited to anyone but looks like a spin-off from Tee Emm, the wartime training manual. There is therefore a good deal of repetition since fighter techniques did not change all that much in the period covered, but perhaps the dedicated will not mind that.

As to form, the type faces are old-fashioned and some of the line drawings are crude so the publishers have printed a cop-out. It says, "The quality of both the type and the illustrations in the original material used in this volume fall short of the high standard of reproduction normally expected in a modern book; they have, of necessity, been reproduced to complete this facsimile edition." Fair enough, but there is no compelling reason why such a book should be a facsimile. It's just cheaper that way.

Because of this economy, Teddy Donaldson's piece (by far the most interesting one) is full of sloppy writing, terrible grammar and factual inaccuracies. It is also not original, having been, very obviously, rewritten in American for an American audience. In a book at this price, it might have been better to skip the facsimile approach and go for a higher standard of editing.—*B.J.L.H.*

Fiat CR.32
(AISA, Via Ampere 49, 20131 Milan, Italy, price 3,000 lire incl. post)
This is the first pictorial supplement to the new *Aerofan*, an Italian aviation quarterly which replaces the remarkable magazine published up to 1977 by the Italian Research Group of Air-Britain in Milan. The new venture is still under the auspices of that doyen of Italian aviation historians, Giorgio Apostolo.

There are 32 large format pages, 74 black and white photographs of aircraft and insignia—mainly Italian A.F. and Spanish Civil War—three-colour photographs, three large colour side view drawings and a double-page two-view cutaway drawing. The text is confined to informative captions. An excellent compilation, although there is little coverage of export aircraft.—*M.B.P.*

Lightplane Construction and Repair
by Al Snyder and William A. Welch
Aircraft Dope and Fabric
by Ruth and Warren Spencer (TAB Books, $3.95 each)
These two paperbacks seem to go together though they make a slightly odd pair. The first one—brightly written and full of tips—"is a practical 'hands-on' book that tells you where to start and how to finish" building a lightplane—in 124 pages. Unfortunately it's the bit in between that's difficult and this short volume seems to epitomise the fallacy of the D.I.Y. book—if you need to be told what it tells you, you shouldn't be doing the job; and if you don't need to be told then you don't need the book. For example, the chapter on the Art of Welding starts off by telling you that "Welding is a *melting* process that allows the metal of two separate pieces to flow together and solidify as a single member." If you don't already know that, perhaps you shouldn't be welding aircraft structures.

Lightplane Construction deals with fabric covering of aircraft in 18 pages. *Aircraft Dope and Fabric* needs all of its 126 pages for that subject alone, thus suggesting that 18 pages may be just the teeniest bit superficial. *Dope and Fabric* is much the better buy.

This is not to say that amateurs can't build or rebuild aeroplanes. They do it all the time, but they bring to it skills of a professional level. If you have these and don't know much about aircraft, these two books will provide much valuable information. However, the reproduction of the photographs is awful.—*B.J.L.H.*

The B-24 Liberator, 1939–1945
by Martin Bowman (Wensum Books, £5.95)
An operational history of the most numerous of all the U.S.A.'s W.W.II aircraft, much in the style of Ian Allan's "At War" books. Attractive, well produced and illustrated with lots of photographs—including some nice colour—Wensum Books set a good standard. The text, however, is disappointing in that, apart from covering largely well reviewed facets of Liberator history, it does not show the care that the author gave to his previous excellent book on B-24s, *Fields Of Little America*.—*A.W.*

F4 Phantom—A Pilot's Story
by Robert Prest (Cassell, £6.95)
We have had books *ad nauseam* over the years by pilots describing their flying careers but this one is different, pleasantly different. First, it is confined to one aircraft type and is written by a pilot who had obviously had "an affair" with the Phantom. Secondly, it describes vividly what life is like in a modern R.A.F. fighter squadron—and this is considerably different from the average wartime reminiscence and an interesting commentary on the attitudes and actions of the military pilot of the 1970s.

Prest's style is like the Phantom itself, fast, never stopping, carrying the reader along on the urgency of it all. The text is studded with abbreviations and technicalities yet the author explains them all so easily in that way that aircrew have of reducing the most technical of activities to simplicity. A most enjoyable book, hard to put down, and giving an authentic insight into the life and activity of today's fighter pilots (for all his Phantom time has been in the AD role). It is illustrated mainly by Ministry of Defence pictures.—*J.D.R.R.*

Published by Profile Books Ltd., Dial House, 6 Park Street, Windsor, Berks., SL4 1LU, distributed by Surridge Dawson & Co (Productions) Ltd., 136-142 New Kent Road, London SE1 6TZ, and printed by Staples Printers Rochester Ltd., at The Stanhope Press.

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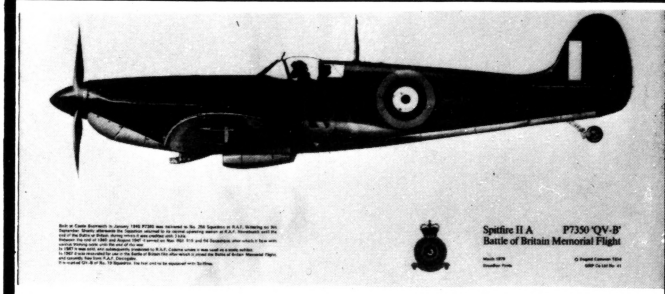

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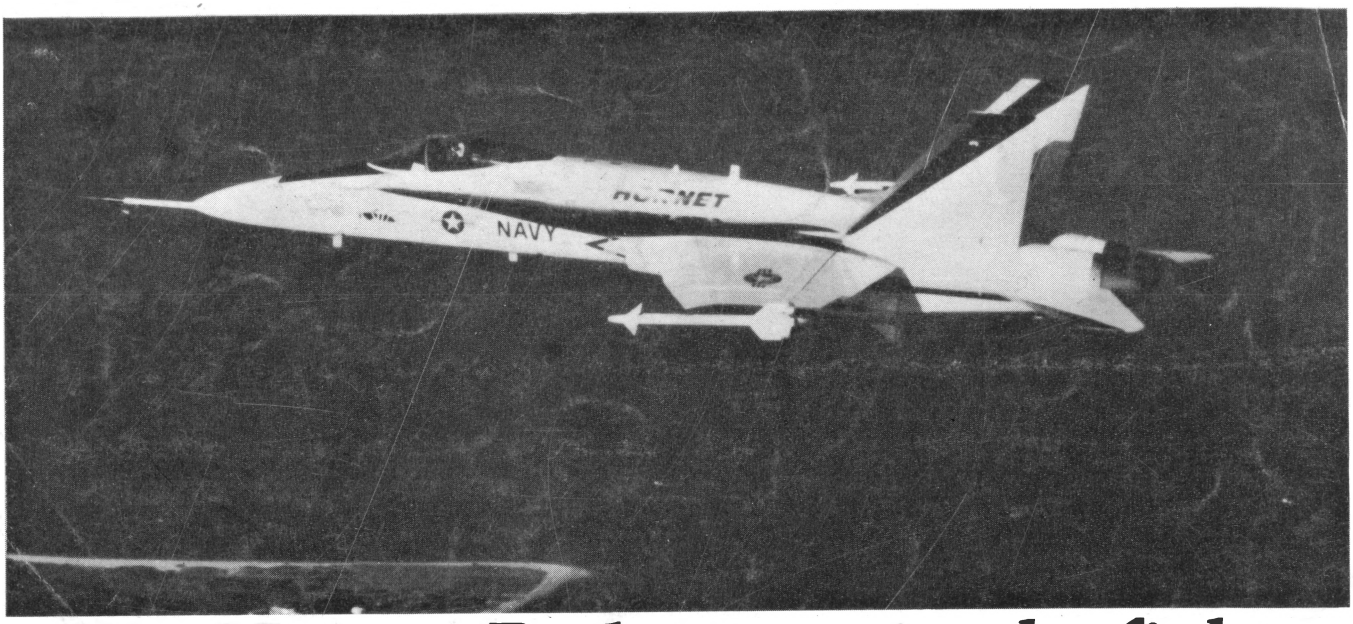

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